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16. Abstract (Limit: 200 words)

This document is the USER's GUIDE to MOBILE1, a computer program that calculates composite emission factors for Hydrocarbons (HC), Carbon Monoxide (CO), and Oxides of Nitrogen (NOx) from motor vehicle, using the methodology and factors presented in MOBILE SOURCE EMISSION FACTORS, FINAL DOCUMENT, EPA-400/9-78 005, published in March, 1978.
The User's Guide describes the input data requirements and organization, the output generated by MOBILE1. In addition, several examples of how to run MOBILE1 are included.

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USER'S GUIDE

to

MOBILE1: MOBILE SOURCE EMISSIONS MODEL

August 1978

U. S. Environmental Protection Agency
Office of Air, Noise, and Radiation
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Designed and written by Lewis E. Guthman

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with Computer Sciences Corporation.

Requests for copies of MOBILE1, for additional copies of this USER'S GUIDE, and for copies of *MOBILE SOURCE EMISSION FACTORS, FINAL DOCUMENT*, March, 1978, as well as questions concerning program use should be directed to:

Office of Mobile Source Air Pollution Control
Emission Control Technology Division
Characterization and Application Branch
2565 Plymouth Road
Ann Arbor, MI 48105

Telephone: 313-668-4306

ERRATA NOTICE

During the course of the distribution of the MOBILE1 source program, a few program errors were discovered, or were brought to our attention by users. These errors were corrected as they became known, and subsequently distributed copies of the source program reflected the corrections.

As a result, the majority of programs were distributed with the corrections included. However, some of the distributed programs include one or more of these errors, which are described in Appendix B. Please check your source program for these errata.

Appendix C presents some additional program errata as well as several program modifications which increase the flexibility of program use. The user is likewise encouraged to review Appendic C.

ABSTRACT

This document is the USER'S GUIDE to MOBILE1, a computer program that calculates composite emission factors for Hydrocarbons (HC), Carbon Monoxide (CO), and Oxides of Nitrogen (NOx) from motor vehicles, using the methodology and factors presented in MOBILE SOURCE EMISSION FACTORS, FINAL DOCUMENT, EPA-400/9-78-005, published in March, 1978.

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I would like to offer a special note of thanks to Len Fleckenstein, of OTLUP, with whom I collaborated in producing MOBILE1, as well as the document on which it is based, MOBILE SOURCE EMISSION FACTORS, FINAL DOCUMENT, March, 1978.

Any errors in MOBILE1 are solely the responsibility of the author.

I. GENERAL DESCRIPTION OF MOBILE1

1.1 INTRODUCTION

MOBILE1 is an integrated set of FORTRAN routines for use in the analysis of the air pollution impact of mobile sources. The system has been designed to provide the user with a flexible, yet easy to use analytic tool which can be utilized in a wide variety of air pollution planning functions.

MOBILE1 computes emissions of pollutants from motor vehicles utilizing the most recent emission factors and methodology promulgated by the United States Environmental Protection Agency. These factors and the associated methodology are completely described in MOBILE SOURCE EMISSION FACTORS, FINAL DOCUMENT, EPA-400/9-78-005, March, 1978. A companion document, MOBILE SOURCE EMISSION FACTORS, FINAL DOCUMENT, For Low-Altitude Areas Only, EPA-400/9-78-006, March, 1978, excludes emission factors specific to California and high-altitude areas.

THIS DOCUMENT WILL BE REFERRED TO IN THE USER'S GUIDE AS 'MSEF'.

Although familiarity with the contents of MSEF is not strictly required for the use of MOBILE1, the prospective user is strongly advised to read MSEF, as the unenlightened use of the program may produce results which, while numerically correct, are, nevertheless, inappropriate for the particular application intended.

MSEF will be re published later this year as a Supplement to AP-42, COMPILATION OF AIR POLLUTANT EMISSION FACTORS. Although MSEF is frequently referred to as "Supplement No. 8" to AP-42, the actual sequence number of the supplement is not yet known.

MOBILE1's modular organization allows for easy and rapid update of emission factor values and for modification of, or addition to, the computational methodology.

The emission factors presented in MSEF and used in MOBILE1 reflect the statutory timetables for new vehicle emission standards prescribed in the Amendments to the Clean Air Act passed by Congress in August, 1977.

MOBILE1 allows the user to generate emissions projections utilizing not only current published deterioration rates, but also other possible or anticipated deterioration rates. Therefore, MOBILE1 includes options to allow for various rates of emission control device deterioration, in addition to those presented in MSEF.

The timetable by which new vehicle emissions are reduced through federal regulations is of prime importance in determining how quickly National Ambient Air Quality Standards are met. It is possible that the present timetable for the implementation of new vehicle emission standards will be modified either by Congress, or by the Administrator of EPA under provisions of the August, 1977 Amendments to the Clean Air Act.

With these considerations in mind, we have built into MOBILE1 the capability of calculating emission factors for virtually all possible new vehicle emission standard timetables.

The major features of MOBILE1 are highlighted below:

1.2 Three Regions

The three regions for which MOBILE1 computes composite emission factors (CEF) are:

- Low Altitude Regions
- California
- High Altitude Regions (>4000 feet)

1.3 Six Vehicle Types

The six vehicle types for which composite emission factors are calculated are:

- Light-Duty Vehicles (LDV)
- Light-Duty Gasoline-Powered Trucks, 0-6000 lbs GVW (LDT1)
- Light-Duty Gasoline-Powered Trucks, 6000-8500 lbs GVW (LDT2)
- Heavy-Duty Gasoline-Powered Trucks (HDG)
- Heavy-Duty Diesel-Powered Vehicles (HDD)
- Motorcycles (MC)

1.4 The Three Pollutants

The three pollutants for which MOBILE1 computes composite emission factors (CEF) are:

- Hydrocarbons (HC)
- Carbon Monoxide (CO)
- Oxides of Nitrogen (NOx)

1.5 Calendar Years Allowed

MOBILE1 calculates composite emission factors for calendar years 1970 through 1999. To reduce computer storage overhead, the program uses the 1995 composite emission factors for later calendar year calculations. This assumption introduces an insignificant error in emission calculations for calendar years later than 1995 since by that year virtually all vehicles on the road will be meeting final new vehicle emission standards. If, however, new vehicle emission standard timetables are significantly extended, this storage-saving approximation will no longer be acceptable.

1.6 Federal Test Procedure

The emission factors for light-duty vehicles and light-duty trucks are derived from statistical analyses of test results from EPA's Emission Factor Program (EFP). Emission testing of these vehicles is performed according to the 1975 Federal Test Procedure (FTP), as stipulated in the Federal Register, Vol. 137, No. 211, November 15, 1972.

The following list summarizes the conditions which occur for FTP testing:

- Ambient temperature = 68° - 86° F (An average temperature of 75° F is assumed to be representative of all tabled emission factor values).
- Ambient humidity = 75 grains
- Average speed for entire FTP driving cycle = 19.6 mph, 18% idle operation.
  - a. Average speed for bags 1 and 3 (cold and hot start bags) = 26 mph
  - b. Average speed for bag 2 (stabilized bag) = 16 mph
- Average % cold start VMT operation = 20.58%
- Average % hot start VMT operation = 27.28%
- Average % stabilized VMT operation = 52.13%
- Air conditioning does not pull large power load
- Vehicle contains driver and fuel only; no passengers, luggage, etc.
- Vehicle is not pulling a trailer.

1.7 Speed/Temperature/Operating Mode Correction Factor

Because all testing is performed under FTP conditions, the basic emission factors are representative of FTP conditions. Therefore, adjustments must be made to the emission factors to more accurately estimate in-use vehicle emissions in scenarios which do not conform to the FTP conditions and assumptions. MOBILE1 computes the appropriate correction factors utilizing the data supplied by the user which describes the scenarios for which emission estimates are desired.

1.8 Credits for Inspection/Maintenance Programs

Emission reduction credit attributable to an annual I/M program will vary according to the type of program in effect, depending on: the stringency factor for determining the emission level for passing or failing tested vehicles; the calendar year of interest and calendar year when I/M was first implemented; the presence of an adequate program of mechanic training; and subsequent years of I/M program operation. MOBILE1 allows the user to apply I/M credits to emissions estimates, taking into account these factors.

The I/M credits computed by MOBILE1 are consistent with the forthcoming revision to Appendix N of Part 51, Chapter 40, Code of Federal Regulations (CFR).

1.9 Additional Correction Factors

MOBILE1 allows the user to optionally include the effect of five "additional" correction factors: 4 for light-duty vehicles and light duty trucks, and 1 for heavy duty gasoline-powered and heavy-duty diesel-powered vehicles.

These correction factors are segregated from those described in previous sections because it is recognized that appropriate input data for their use is not as easily obtainable for most users.

The four 'additional' correction factors for light-duty vehicles are:

- Air-conditioning correction factor.
- Extra loading correction factor.
- Trailer-towing correction factor.
- Humidity correction factor.

The 'additional" correction factor for heavy-duty gasoline-powered and diesel-powered vehicles is used to take into account the weight/power ratios of these vehicles in calculating their emissions.

1.10 Composite Idle Emission Factors

MOBILE1 allows the user to optionally generate composite idle emission factors. These factors are measures of the emission of pollutants from idling vehicles, in units of gm/minute.

1.11 Additional HC Factor Options

MOBILE1 includes two options specific to HC emission calculations.

MOBILE1 will optionally output composite crankcase and evaporative HC emission factors for each vehicle type, in addition to the total HC emission factor (which includes the exhaust HC emissions).

MOBILE1 also has an option which allows the user to generate either total or non-methane hydrocarbon composite emission factors.

II. DATA REQUIREMENTS AND ORGANIZATION

The reader is strongly encouraged to refer to the examples in Chapter IV when reading this chapter.

MOBILE1 utilizes one input data set. This data set supplies program control data and the data describing the scenarios for which composite emission factors are to be calculated. The input data set consists of three distinct sections: the CONTROL SECTION, the ONE-TIME DATA SECTION, and the PARAMETER SECTION. These sections are described below.

2.1 Control Section

The CONTROL SECTION consists of 16 records which are used for program control; the remainder of the input data contain the data describing the "scenarios" for which composite emission factors are desired.

These 16 records (with the exception of the second record--see below) contain a single digital value in column one of the record and are referred to as FLAGS.

Each record in the CONTROL SECTION is REQUIRED.

2.1.1 Input and Execution Flags

Record No. 1: IPROMPT

IPROMPT is set equal to one if the user desires prompting messages for input data. It is suggested that this option be used if the user is uncertain of the order of input data.

If MOBILE1 is being used in the batch mode with IPROMPT = 1, the prompting messages will be intermingled with the formatted output. See Example 4.13.

Record No. 2: Output Title

This record is printed at the top of the formatted output data set. The user may utilize all 80 columns, or any part thereof. The character string entered on this record need not be left-justified. If the user does not want a title, a blank record must be entered. See the Examples in Chapter 4.

Record No. 3: INFLAG

INFLAG indicates the type of FORTRAN READ statement used by MOBILE1 to read the input data. There are two choices: a list-directed read statement and a regular format-directed READ statement. See Examples 4.1 and 4.2.

Record No. 4: SP3FLG

SP3FLG indicates whether the parameter records contain one value for average speed or three values. This flag may be set when the the user is able to extract from the traffic data three speeds corresponding to FTP bag speeds. Most users will use MOBILE1 with SP3FLG=0. See Example 4.3.

Record No. 5: VMFLAG

VMFLAG indicates whether the user is entering a Vehicle Miles Traveled (VMT) mix or using the default national average mix. See Examples 4.4 and 4.5.

Record No. 6: MYMRFG

MYMRFG indicates whether the user is entering vehicle registration and/or annual mileage accrual distributions or using the default national average distributions. See Examples 4.6, 4.7, and 4.8.

Record No. 7: ALTFLG

ALTFLG indicates whether the user desires to modify any of the emission factors used in the program. The additional input required when ALTFLG=1 is described below in the ONE-TIME DATA SECTION. See Example 4.9.

Record No. 8: IMFLG

IMFLG indicates whether the computed emission factors should include credits for an Inspection/Maintenance program. See Example 4.10.

Record No. 9: ALHFLG

ALHFLG indicates whether the composite emission factor computation should include the effects of the four "additional" correction factors for light-duty vehicles. These four factors are identified in Section 1.9. See Example 4.11.

Record No. 10: TRKFLG

TRKFLG indicates whether the composite emission factor computation for heavy-duty gasoline-powered and diesel-powered vehicles should include the effect of the 'additional" correction factor based on the power/weight ratios of these vehicles. See Example 4.12.

The following tables describe the control records of the input data set.

Flags Controlling Input and Execution				
Record No.	Var. Name	Description	Format	Value--->ACTION
1	IPROMT	Flag for prompting of input	I1	0 - Program does not prompt for input. 1 - Program prompts for input.
2	PROJID	80-characters for output header	20A4	------

Flags Controlling Input and Execution (continued)

Record No.	Var. Name	Description	Format	Value--->ACTION
3	INFLAG	Chooses type of Fortran READ	I1	0.- List directed READ 1.- Formatted READ
4	SP3FLG	Flags optional use of 3 input speeds per loop.	I1	0.- 1 input speed per loop. 1.- 3 input speeds per loop.
5	VMFLG	Flags optional use of user VMT mix.	I1	0.- Use default national mix. 1.- User supplies VMT mix for each scenario. 2.- User supplies one VMT mix for all scenarios.
6	MYMRFG	Flag for optional input of user registration and/or mileage accrual distributions.	I1	0.- Use default regist. and mileage accum. distributions. 1.- User supplies mileage dist. 2.- User supplies regist. dist. 3.- User supplies both dist.
7	ALTFLG	Flag for optional modification of model year emission factors.	I1	0.- Use default factors. 1.- User modifies factors.
8	IMFLG	Include impact of insp./maint. program in calculations.	I1	0.- No I/M prog. 1.- Include I/M

Flags Controlling Input and Execution (continued)				
Record No.	Var. Name	Description	Format	Value--->ACTION
9	ALHFLG	Flags optional use of 4 special LDV correction factors: a) air-conditioning; b) vehicle loading; c) trailer towing; d) humidity (NOx only).	I1	0 - 4 factors not included. 1 - 4 factors are included.
10	TRKFLG	Flags optional use of HDV power/weight correction factor.	I1	0 - Do not use HDV factor. 1 - Use HDV factor

2.1.2 Flags Controlling Output

Records 11 through 16 of INDATA primarily control the form and content of the output from MOBILE1. These records are described below.

Record No. 11: IFORM

IFORM indicates which of the two formatted outputs is desired. If IFORM = 0 MOBILE1 generates a formatted output data set suitable for use as input to another program. If IFORM = 1 MOBILE1 generates a formatted output data set more suited to visual analysis and as a printed record of the emission calculation. See Examples 4.1 and 4.2.

Record No. 12: PRTFLG

PRTFLG indicates for which pollutants the user wishes the composite emission factors to be printed. If PRTFLG = 0, the composite factors are printed for all three pollutants. If PRTFLG = 1, only HC factors are generated. If PRTFLG = 2, only CO factors are generated. If PRTFLG = 3, only NOx factors are generated. See Example 4.13.

Record No. 13: ICEVFG

ICEVFG indicates whether the user desires a separate listing of the crankcase and evaporative HC emission factors, whose values are included in the composite HC emission factors usually printed. If ICEVFG=1, this option is invoked. If ICEVFG=0, this option is not invoked. See Example 4.13.

Record No. 14: IDLFLG

IDLFLG indicates whether the user desires IDLE composite emission factors to be printed in addition to the running composite emission factors. If IDLFLG=1, this option is invoked. If IDLFLG=0, this option is not invoked. See Example 4.13.

Record No. 15: NMHFLG

NMHFLG indicates whether the user desires total HC emission factors to be generated and printed, or non-methane HC emission factors to be generated and printed. If NMHFLG=0, total HC factors are calculated and printed. If NMHFLG=1, non-methane HC factors are calculated and printed. See Example 4.13.

Record No. 16: UNFFLG

UNFFLG indicates whether the user desires an UNFORMATTED output data set to be generated in addition to the formatted output data set. The unformatted data set is not generated if UNFFLG=0, and it is generated if UNFFLG=1. See Example 4.13.

Flags Controlling Output

Record No.	Var. Name	Description	Format	Value--->ACTION
11	IFORM	Selects one of two forms of formatted output.	I1	0 - Numeric format 1 - Descriptive format

Flags Controlling Output (continued)				
Record No.	**Var. Name**	**Description**	**Format**	**Value--->ACTION**
12	PRTFLG	Selects which factors are included in output.	I1	0 - HC,CO,NOx 1 - HC only 2 - CO only 3 - NOx only
13	ICEVFG	Controls listing of evap. HC factors in addition to total HC factors.	I1	0 - No evap factors 1 - Output evap.
14	IDLFLG	Controls output of idle factors	I1	0 - No idle output. 1 - Output idle fac
15	NMHFLG	Selects total or non-methane HC	I1	0 - Total HC 1 - Non-methane HC
16	UNFFLG	Flags optional output of unformatted data set.	I1	0 - No unformatted output. 1 - Output unf.

2.2 One-time Data Section

The ONE-TIME DATA SECTION contains information which, as the name implies, is required only once for input to MOBILE1. These records are OPTIONAL, their use being dictated by the values of some of the INPUT flags. If any of these records are included, they follow immediately after the CONTROL SECTION, and in the order in which they are described below.

The ONE-TIME DATA SECTION will be included if one or more of the following MOBILE1 options is desired:

1. The user wishes to input ONE VMT mix which will apply to ALL composite emission factor calculations (VMFLAG=2).
2. The user wishes to use local mileage accumulation and/or registration distributions (MYMRFG=1, 2, or 3).
3. The user wishes to modify the basic emission factors used in the calculation of the composite emission factors (ALTFLG=1).
4. The user wishes to include Inspection/Maintenance credits in the composite emission factor calculations (IMFLG=1).

IN THE ONE-TIME DATA SECTION, THE ORDER OF DATA IS THE SAME AS THE ORDER OF THE ASSOCIATED FLAGS IN THE CONTROL SECTION.

2.2.1 One-Time VMT Mix

If VMFLAG (Record No. 5) has the value 2, this record is required. It contains the VMT mix that the user wishes to use FOR THE ENTIRE RUN. The record has the format 6F4.3, the six values being the fractions of the total VMT for each of the six vehicle types.

If a different VMT mix is desired for each scenario or calendar year, then VMFLAG should be assigned the value 1, and the VMT mixes should be entered in the emission factor parameter section. See Section 2.3.2 below. Also see Example 4.5.

2.2.2 Mileage and Registration Distributions

If MYMRFG (Record No. 6) has any of the values 1, 2, or 3, this group of records is required.

If MYMRFG = 1, the user must input annual rates of mileage accrual distributions for each of the six vehicle types.

If MYMRFG = 2, the user must input vehicle registration distributions for each of the six vehicle types.

If MYMRFG = 3, the user must input BOTH of the above distributions.

Each of these distributions is entered on 12 records, two for each vehicle type. The order of vehicle types is that listed in Section 1.3. The first of each two records contains the annual rates of mileage accrual, divided by 100,000, for vehicles with ages ranging from 1 to 10, OR the fraction of total vehicles of that type registered, from ages 1 to 10. The second record of the pair contains the same information, but for vehicles aged 11 to 20 years.

The format of each record is 10F5.3.

If MYMRFG = 3, the entire set of 12 mileage accrual rate records precedes the 12 registration distribution records.

Remember that the mileage accrual rates are divided by 100,000.

If this flag is set, the mileage and/or registration data for ALL vehicle types must be entered. Therefore, if the user wishes to input local data for fewer than the six vehicle types, he should supplement the local data with the nationwide average data listed in the appropriate BLOCK DATA subroutine. The default nationwide average annual mileage accumulations (divided by 100000) and vehicle registration distributions are listed in Appendix A, Section 17. See Examples 4.6, 4.7, and 4.8.

2.2.3 Emission Factor Modification Data

If ALTFIG (Record No. 7) has the value 1, the user is required to input information describing how the basic emission factors are to be modified.

This option requires the user to input two kinds of records. The first is merely one record specifying the number of emission factor alteration records which follow, using an I2 FORMAT. This record is followed by the number of records specified on it. Each of these records contains the following information:

1. Region (1-3)
2. Vehicle type (1-6)
3. Pollutant (1-3)
4. First model year for which factors are to be modified (66-95)
5. Last model year for which factors are to be modified (66-95, but not less than the value in item 4)
6. New value of zero-mileage emission rate.
7. New value of emission factor deterioration rate per 10000 miles.

The format of this record is 3(I1,1X),2(I2,1X),F6.2,1X,F6.2.

See Example 4.9.

2.2.4 Inspection/Maintenance Data

If IMFLG (Record No. 8) has the value 1, the user must input one record describing the Inspection/Maintenance program whose impact on emissions it is desired to include. The 5 required items are listed below, with the ranges of allowable values following in parentheses:

1. Year of I/M program implementation (70-99).
2. Stringency level of I/M program (10-50).
3. Mechanic Training flag, indicating whether mechanic training is an integral part of I/M program (0-No/1-Yes).
4. Earliest model year included in I/M program (51-99).
5. Latest model year to be included in I/M program (52-99, but greater than value in item 4).

The last two items are included to allow the user to EXCLUDE a certain range of model years from the I/M program, if so desired. If ALL vehicles are included in the program, the last two items should be given the values 51 and 99, respectively.

The format of this record is I2,1X,I2,1X,I1,1X,I2,1X,I2.

The I/M credits incorporated into the emission factors under this option assume an annual inspection cycle.

See Example 4.10.

2.3 Emission Factor Parameter Section

This section contains one or more GROUPS of records describing the scenarios for which emissions are desired. This section of input data follows the ONE-TIME DATA SECTION, if it exists. Otherwise, it follows the CONTROL SECTION.

The user can calculate emissions for one or more scenarios. Each scenario is associated with one GROUP of PARAMETER SECTION records.

The program terminates execution upon detecting an end-of-file condition.

Each GROUP of PARAMETER SECTION records is composed of 1 to 4 records, the number being determined by the values of certain FLAGS.

IN THE PARAMETER SECTION, THE ORDER OF THE OPTIONAL RECORDS IS THE SAME AS THE ORDER OF THE ASSOCIATED FLAGS IN THE CONTROL SECTION.

These records are described below.

2.3.1 Scenario Records

Each of these records contains the parameter values describing the scenarios for which a set of composite emission factors is desired.

The seven fields comprising each of these records are described below.

Description of Fields in INDATA Parameter Records

Field	Var. Name	Description	Format	Allowed Values
1	IREJN	Specifies for which of 3 regions emission factors are to be computed.	I1	1 - Low Altitude 2 - California 3 - High altitude
2	CY	Last 2 digits of calendar year for which emissions are to be calculated.	I2	$70 \leq CY \leq 99$

Description of Fields in INDATA Parameter Records (continued)

Field	Var. Name	Description	Format	Allowed Values
3	SP1	The single average route speed for link or area for which factors are being calculated.	F4.1	$0 < \mathrm{SP1} \le 60$ mph
		-OR-		
3	SPD	The three average bag speeds for link or area for which factors are being calculated.	3F5.1	$0 < \mathrm{SPD} \le 60$ mph
4	TEMP	Ambient temperature(Fahrenheit)	F4.1	$0^\circ \le \mathrm{TEMP} \le 110^\circ$
5	PCCO	% of non-catalyst-equipped LDV VMT accumulated in cold start mode.	F4.0	$0 \le \mathrm{PCCO} \le 100.$
6	PCHS	% of catalyst-equipped LDV VMT accumulated in hot start mode.	F4.0	$0 \le \mathrm{PCHS} \le 100.$
7	PCCC	% of catalyst-equipped LDV VMT accumulated in cold start mode.	F4.0	$0 \le \mathrm{PCCC} \le 100.$

There is a one-column space between each of the above fields.

Data elements in a record to be read by a list-directed READ may be entered without regard for column boundaries, and the fields may be separated by commas or blanks. In addition, real constants with integral values may be entered without the decimal point. See Example 4.1.

The user will note that the percentage of non-catalyst-equipped LDV VMT accumulated in the hot start mode is not required for input. MOBILE1 calculates this quantity from the three similar values entered, PCCO, PCHS, and PCCC, equating it to the quantity PCHS + PCCC - PCCO. This constraint equation assumes implicitly that the percentage of hot stabilized VMT is equal for catalyst-equipped and non-catalyst-equipped LDVs.

The user should not expect the sum PCCC + PCHS + PCCC to equal 100%. While it is true that %cold start VMT + %hot start VMT + %hot stabilized VMT always equals 100% (and separately for catalyst equipped and non-catalyst-equipped vehicles, if such a separation is made), the three items PCCO, PCHS, and PCCC are not equivalent to the items in this equation, as the user can verify by reviewing the definitions presented above.

VALUES MUST BE ENTERED FOR ALL FIELDS. THERE ARE NO DEFAULT VALUES FOR THESE VARIABLES.

2.3.2 VMT Split

If VMFLAG (Record No. 5) has the value 1, this record is required. It contains the VMT mix that the user wishes to use FOR THIS SCENARIO ONLY. The record has the format 6F4.3, the six values being the fractions of the total VMT for each of the six vehicle types. If the same VMT mix is to be used for each scenario, VMFLAG may be set to 2. See Section 2.2.1 above. Also see Example 4.4.

2.3.3 Parameters for Additional LDV Correction Factors

If ALHFLG (Record No. 9) equals 1, this record is required.

One of these records is required for each scenario record.

The FORMAT of this record is 6F4.3.

The six values to be supplied are described below:

- AC, the fraction of LDVs which have air-conditioning and are using it
- XLOAD, a REAL array of size 3;the fraction of vehicles with an additional 500 pound loading, for LDV, LDT1, and LDT2.
- TRAILR, the fraction of LDVs towing a trailer
- ABSHUM, the ambient absolute humidity

If ALHFLG=1, all values must be entered. Therefore, if the user wishes to utilize fewer than the four additional correction factors, values for the factors not being used must also be entered; these values, moreover, must be those that yield a value of one for these factors not used. The normalizing value for the first three factors (and, thus, the first five fields) is ~~1.0.~~ 0.0. For the humidity correction factor, the normalizing value is 75. See Example 4.11.

2.3.4 Parameters for Additional HDV Correction Factor

If TRKFLG (Record No. 10) equals 1, this record is required.

One of these records is required for each scenario record.

The FORMAT of this record is 4F5.0.

The four values to be supplied are described below:

- HGWGT, the average gross vehicle weight for heavy-duty gas vehicles
- HDWGT, the average GVW for heavy-duty diesel vehicles
- HGCID, the average cubic inch displacement for HDG vehicles
- HDCID, the average cubic inch displacement for HDD vehicles

If TRKFLG=1, all values must be entered.

See Example 4.12.

III. MOBILE1 OUTPUT

MOBILE1 generates two formatted output data sets. The choice of which formatted output data set is generated and the contents of the data set is defined by the user by the choice of flag values.

MOBILE1 also includes the facility for generating an unformatted output data set, also controlled by a flag value. These output data sets are described below.

The default data set reference numbers for the formatted and unformatted output data sets are 6 and 9, respectively. The user may change these default values by modifying the values in the appropriate DATA statements in SUBROUTINE INPUT and SUBROUTINE OUTPUT. In SUBROUTINE INPUT, the appropriate statement is:

```
DATA IREAD,IWRI/5,6/
```

In SUBROUTINE OUTPUT, the appropriate statement is:

```
DATA IWRI,IWRUNF/6,9/
```

3.1 Formatted Output

There are two possible formatted output data sets. The user specifies which of the two is to be generated by choice of the value of IFORM (Record No. 11). If IFORM = 0, MOBILE1 generates a formatted data set suitable for use as input for subsequent computer analysis. If IFORM = 1, a more descriptive output data set is generated. This 'formatted' output data set is designed to provide a well-annotated record of the user's emissions analysis.

3.1.1 Numeric Format

This data set is generated if IFORM = 0. The data set consists of 4 heading records (to give minimal column descriptions), followed one record for each pollutant and for each scenario.

For example, if the user is calculating emissions for 10 scenarios and is outputting factors for all three pollutants, there will be 30 data records in this output data set.

If, however, the value of PRTFLG (Record No. 12) is, say, 2, there will be ten data records for the example described above.

The information generated on each record is identical, and is described below:

The fields contain, reading from left to right, the REGION, the CALENDAR YEAR, the three 'bag' speeds (which will be identical if SP3FLG=0), the AMBIENT TEMPERATURE, the three cold/hot start percentages, pollutant code (1 for HC, 2 for CO, 3 for NOx, and C for the optional separate listing of crankcase and evaporative HC), the six composite emission factors (for the six vehicle types), the VMT split, and the average composite emission factor for all vehicles.

From the above description, it can be seen that this record lists the data on the input SCENARIO record, followed by the six composite factors, the VMT mix, and the average composite factor.

See Example 4.1.

3.1.2 Descriptive Format

The 'descriptive format' output data set is created if IFORM=1. This data set is organized for easy visual analysis. The information generated in this data set is described below:

If ALTFLG=1, the output begins with a listing of the emission factor modification information. This is described below.

The first line printed is identical to the second input record. This is followed by a reminder that the HC emission factors include crankcase and evaporative factors. The rest of the output consists of one or more sections, identical in format, which are separated by dashed lines.

Each of these sections consists of two parts: the top part describes the scenario for which composite factors have been calculated; the bottom part presents the factors.

The first line lists the calendar year, temperature, and VMT mix. If the user did not include a VMT mix in the input data set, the default nationwide average VMT mix is listed. The second line begins by identifying the region (49-State, California, or high-altitude). Next follows speed information. If the user has input one speed per scenario record (SP3FLG=0), this speed is listed. This speed is followed by a colon and the three "bag" speeds, separated by slashes, and the speed used for the HDV speed correction calculation, in parentheses. In the case of SP3FLG=0, all of these numbers are identical. If the user has input three speeds for each scenario record, these speeds are listed, followed by the speed used for the HDV calculation (which is identical to the "bag 2" speed.

The speed information is followed by the cold/hot start data input on the SCENARIO record.

If the user has set ALHFLG=1, TRKFLG=1, or IMFLG=1, additional lines follow which describe the input parameters associated with these options.

The bottom part of each section lists the computed factors. In the first six columns are listed the composite factors for the six vehicle types. The next column contains the average composite emission factor for all vehicles, which has been calculated from the vehicle-specific emission factors and the VMT mix.

As mentioned above, if ALTFLG=1, the output begins with a listing of the emission factor modification information. The printed description consists of the same data that the user included in the input data set. The columns labeled "BASE" and "DEL" refer to the new emission factor zero-mileage emission rate and deterioration rate per 10000 miles, respectively.

There is an additional column labeled 'ALTERED', which will have one of two possible entries: "YES" or "NO". If a listed emission factor modification has the value "YES" in this column, the modification WAS made and the new factor has been used in the run. If a listed modification has the value "NC", the modification was NOT made, due to internal program array size constraints, and the modified factor has NOT been used in the run. This second situation will rarely arise.

See Examples 4.2 through 4.13.

3.2 Unformatted Output

MOBILE1 generates an unformatted output data set if UNFFLG (Record No. 16) has the value 1. The unformatted output data set is generated in addition to the formatted data set. An unformatted output data set is generated by a FORTRAN unformatted WRITE statement, which has the form WRITE(n) VAR1,VAR2,..., where n is the unit record number of the device to which the data set is directed.

The unformatted WRITE creates a data set which can subsequently be retrieved only by a FORTRAN unformatted READ statement.

IV. EXAMPLES OF MODEL USE

This sections presents 13 examples of input to MOBILE1 and the associated MOBILE1 output listings. The outputs for all but the first example are those generated by IFORM=1. There are two reasons for this: (1) the IFORM=1 output data set is 80 columns wide, making its inclusion in this document much easier than the 130-column IFORM=0 output; (2) the IFORM=1 output data set is more descriptive than the IFORM=0 data set.

In some of the examples below, some of the input records are identified on the right side of the record. These brief descriptions and the arrows (<--) to their left, are not required.

Similarly, the names of the flags in the CONTROL SECTION (IPROMT, INFLAG, etc.) are not required.

4.1 Example 1: List-directed Input

```
0         IPROMT
EXAMPLE 1: LIST-DIRECTED INPUT
0         INFLAG
0         SP3FLG
0         VMFLAG
0         MYMRFG                            <--INPUT FLAGS
0         ALTFLG
0         IMFLG
0         ALHFLG
0         TRKFLG_____________________________________________
0         IFORM
0         PRTFLG
0         ICEVFG                            <--OUTPUT FLAGS
0         IDLFLG
0         NMHFLG
0         UNFFLG
1,70,19.6,75,20.58,27.28,20.58

^
|
|
Col. 1
```

CONTROL SECTION

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, INFLAG=0, requiring the parameter record to be in list-directed form. This input file will cause MOBILE1 to generate low-altitude factors for calendar year 1970, average route speed of 19.6 mph, ambient temperature of 75.(F), 20.58% cold start VMT for non-catalyst-equipped autos, 27.28% hot start VMT for catalyst-equipped autos, and 20.58% cold start VMT for catalyst-equipped autos.

The output record length for IFORM=0 output is 130. Therefore, the output for the first example is listed in three sections on the following page.

EXAMPLE 1: LIST-DIRECTED INPUT

```
R
E                          AMB.
G CY    BAG SPEEDS      TMP    COLD/HOT START
- --  --------------  ---    ----------------
1 70  19.6/19.6/19.6  75.    20.6   27.3   20.6
1 70  19.6/19.6/19.6  75.    20.6   27.3   20.6
1 70  19.6/19.6/19.6  75.    20.6   27.3   20.6

↑
|
|
Col. 1
```

```
P
O          COMPOSITE EMISSION FACTORS
L    LDV     LDT1    LDT2    HDG     HDD     MC
- ------------------------------------------------
1   10.79   11.36   16.57   35.30    4.37   11.50
2   76.66   79.24  101.04  301.06   35.84   36.28
3    3.78    3.75    6.19    9.01   21.57    0.13

↑
|
|
Col. 43
```

```
           VEHICLE MIX                      C.E.F.
 LDV    LDT1   LDT2   HDG    HDD    MC    ALL VEH
-----------------------------------------  ------
0.803 0.058 0.058 0.045 0.031 0.005   12.07
0.803 0.058 0.058 0.045 0.031 0.005   86.86
0.803 0.058 0.058 0.045 0.031 0.005    4.68

↑
|
|
Col. 87
```

4.2 Example 2: Formatted Input

```
0         IPRINT
EXAMPLE 2: FORMATTED INPUT
1         INFLAG
0         SP3FLG
0         VMFLAG
0         MYMRFG                     <--INPUT FLAGS
0         ALTFLG
0         INFLG
0         ALHFLG
0         TRKFLG______________________________________
1         IFORE
0         PRTFLG                     <--OUTPUT FLAGS
0         ICRVFG
0         ICLFLG
0         NMHFLG
0         UNFFLG
1 70 19.6 75.0 20.6 27.3 20.6

^
|
|
Col. 1
```

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, INFLAG=1, requiring the parameter record to be in formatted form. Otherwise, this example is identical to the previous one.

The output for this example is listed on the following page.

AMPLE 2: FORMATTED INPUT

```
*   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
--------------------------------------------------------------------------
                                  VEH. TYPE:  LDV   LDT1  LDT2   HDG   HDD   MC
AL. YEAR: 1970    TEMP: 75.0(F)          0.803/0.058/0.058/0.045/0.031/0.005
EGION: 49-STATE   19.6:19.6/19.6/19.6 MPH (19.6)       20.6/ 27.3/ 20.6

                          COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1      LDT2      HDG       HDD       MC     ALL MODES
 TOTAL HC:    10.79     11.36     16.57     35.30      4.37     11.50     12.07
HAUST  CO:    76.68     79.25    101.06    301.06     35.84     36.29     86.87
HAUST NOx:     3.78      3.75      6.19      9.01     21.57      0.13      4.68
--------------------------------------------------------------------------
```

4.3 Example 3: 3-speed Input

```
0         IPROMT
EXAMPLE 3: 3-SPEED INPUT
1         INFLAG
1         SP3FLG
0         VMFLAG
0         MYMRFG                                    <--INPUT FLAGS
0         ALTFLG
0         IMFLG
0         ALHFLG
0         TEMFLG_________________________________________
1         IFORM
0         PRTFLG
0         ICEVFG                                   <--OUTPUT FLAGS
0         IDLFLG
0         NMHFLG
0         UNFFLG
1 81 26.0 16.0 26.0 75.0 20.6 27.3 20.6
1 82 26.0 16.0 26.0 75.0 20.6 27.3 20.6
1 83 26.0 16.0 26.0 75.0 20.6 27.3 20.6
1 84 26.0 16.0 26.0 75.0 20.6 27.3 20.6
1 85 26.0 16.0 26.0 75.0 20.6 27.3 20.6

↑
|
|
Col. 1
```

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, SP3FLG=1, requiring three speeds for each scenario record. These three speeds should represent the average speeds for the cold start, hot start, and hot stabilized portions, respectively, of the average trip characterized by the scenario record. In this example, we are using the speeds 26.0, 16.0, and 26.0 for each scenario record (these happen to be the average bag speeds for the FTP).

The effect of setting this flag is the substitution of three speed values for the single value required when this flag is not set, which 'pushes' the temperature and hot/cold start fields to the right.

The output for this example is listed on the following page.

EXAMPLE 3: 3-SPEED INPUT

```
 *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
-------------------------------------------------------------------------------
                                  VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
 CAL. YEAR: 1981       TEMP: 75.0(F)         0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE      26.0/16.0/26.0 MPH (16.0)            20.6/ 27.3/ 20.6

                          COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV       LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:      4.40      5.80      8.89     30.17      5.29      6.43       5.94
 EXHAUST  CO:    41.42     55.40     70.57    314.48     34.75     23.14      55.91
 EXHAUST NOx:     2.43      2.60      4.34      9.75     22.33      0.35       3.49
-------------------------------------------------------------------------------
                                  VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
 CAL. YEAR: 1982       TEMP: 75.0(F)         0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE      26.0/16.0/26.0 MPH (16.0)            20.6/ 27.3/ 20.6

                          COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV       LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:      3.78      5.39      8.13     27.28      5.35      5.73       5.24
 EXHAUST  CO:    36.03     54.01     67.91    306.38     34.59     20.95      50.97
 EXHAUST NOx:     2.21      2.51      3.99      9.56     22.38      0.43       3.28
-------------------------------------------------------------------------------
                                  VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
 CAL. YEAR: 1983       TEMP: 75.0(F)         0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE      26.0/16.0/26.0 MPH (16.0)            20.6/ 27.3/ 20.6

                          COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV       LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:      3.26      4.98      7.44     24.61      5.18      4.92       4.63
 EXHAUST  CO:    31.16     51.77     64.99    288.02     34.47     18.30      45.91
 EXHAUST NOx:     2.04      2.46      3.72      9.41     22.41      0.47       3.12
-------------------------------------------------------------------------------
                                  VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
 CAL. YEAR: 1984       TEMP: 75.0(F)         0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE      26.0/16.0/26.0 MPH (16.0)            20.6/ 27.3/ 20.6

                          COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV       LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:      2.84      4.57      6.74     22.00      4.85      3.57       4.10
 EXHAUST  CO:    27.05     48.66     61.02    260.61     34.40     13.84      40.94
 EXHAUST NOx:     1.91      2.44      3.48      9.29     22.43      0.50       2.99
-------------------------------------------------------------------------------
                                  VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
 CAL. YEAR: 1985       TEMP: 75.0(F)         0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE      26.0/16.0/26.0 MPH (16.0)            20.6/ 27.3/ 20.6

                          COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV       LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:      2.51      4.19      6.06     19.76      4.54      2.53       3.65
 EXHAUST  CO:    23.72     45.30     56.58    233.91     34.28     10.47      36.60
 EXHAUST NOx:     1.81      2.31      3.20      8.91     20.79      0.47       2.82
-------------------------------------------------------------------------------
```

4.4 Example 4: User-Supplied VMT Mix

```
0         IPROMT                                                  C
EXAMPLE 4: USER-SUPPLIED VMT MIX                                  O
1         IMFLAG                                                  N
0         SP3FLG                                                  T
1         VMFLAG                                                  R
0         MYMRFG                      <--INPUT FLAGS              O
0         ALTFLG                                                  L
0         IMFLG
0         ALHFLG                                                  S
0         TRKFLG_________________________________________         E
1         IFORM                                                   C
0         PRTFLG                                                  T
0         ICEVFG                      <--OUTPUT FLAGS             I
0         IDLFLG                                                  O
0         NMHFLG                                                  N
0         UNFFLG
1 75 19.6 75.0 20.6 27.3 20.6
.760.030.040.080.080.010
1 79 19.6 75.0 20.6 27.3 20.6
.740.035.045.085.085.010

^
|
|
Col. 1
```

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, VMFLAG=1, indicating that the user will supply a VMT mix for each scenario record for which emission factors are desired. The VMT mix record follows the scenario record to which it applies.

In this example, the VMT mix for 1975 is 76% LDV, 3% LDT1, 4% LDT2, 8% HDG, 8% HDD, and 1% MC. The VMT mix for 1979 is 74% LDV, 3.5% LDT1, 4.5% LDT2, 8.5% HDG, 8.5% HDD, and 1% MC.

The output for this example is listed on the following page.

EXAMPLE 4: USER-SUPPLIED VMT MIX

```
  *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
----------------------------------------------------------------------------------------
                                VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1975      TEMP: 75.0(F)         0.760/0.030/0.040/0.080/0.080/0.010
 REGION: 49-STATE     19.6:19.6/19.6/19.6 MPH (19.6)       20.6/ 27.3/ 20.6

                         COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV       LDT1       LDT2      HDG       HDD        MC      ALL MODES
   TOTAL HC:     8.27      8.98      12.60     29.99      4.42     11.50       9.93
 EXHAUST  CO:   67.72     70.68      83.69    277.23     33.51     36.29      82.16
 EXHAUST NOx:    3.59      3.59       5.47     10.76     21.20      0.13       5.61
----------------------------------------------------------------------------------------
                                VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1979      TEMP: 75.0(F)         0.740/0.035/0.045/0.085/0.085/0.010
 REGION: 49-STATE     19.6:19.6/19.6/19.6 MPH (19.6)       20.6/ 27.3/ 20.6

                         COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV       LDT1       LDT2      HDG       HDD        MC      ALL MODES
   TOTAL HC:     6.03      7.08      10.74     28.22      4.52      9.18       8.07
 EXHAUST  CO:   54.51     61.69      78.42    271.77     29.38     30.80      71.93
 EXHAUST NOx:    2.73      2.83       4.96     10.53     20.53      0.19       4.99
----------------------------------------------------------------------------------------
```

4.5 Example 5: User-Supplied One-Time VMT Mix

```
0         IPROMT
EXAMPLE 5: USER-SUPPLIED ONE-TIME VMT MIX
1         INFLAG
0         SP3FLG
2         VMFLAG
0         MYMRFG                                  <--INPUT FLAGS
0         ALTFLG
0         IMFLG
0         ALHFLG
0         TRKFLG_____________________________________________
1         IFORM
0         PRTFLG
0         ICEVFG                                 <--OUTPUT FLAGS
0         IDLFLG
0         NMHFLG
0         UNFFLG
.803.058.058.045.031.005
1 75 19.6 75.0 20.6 27.3 20.6
1 79 19.6 75.0 20.6 27.3 20.6

↑
|
|
Col. 1
```

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, VMFLAG=2, indicating that the user is supplying ONE VMT mix which will apply to all scenario records, and which overrides the nationwide average VMT mix supplied by MOBILE1. This option thus makes the VMT mix a one-time data record which precedes the scenario records.

The output for this example is listed on the following page.

```
EXAMPLE 5: USER-SUPPLIED ONE-TIME VMT MIX

 *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
--------------------------------------------------------------------------------------------
                            VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1975     TEMP: 75.0(F)      0.803/0.058/0.058/0.045/0.031/0.005
REGION: 49-STATE    19.6:19.6/19.6/19.6 MPH (19.6)      20.6/ 27.3/ 20.6

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1      LDT2      HDG      HDD       MC      ALL MODES
   TOTAL HC:    8.27     8.98     12.60     29.99     4.42    11.50       9.44
 EXHAUST  CO:  67.72     7[illegible].68     83.69    277.23    33.51    36.29      77.0[illegible]
 EXHAUST NOx:   3.59     3.59      5.47     10.76    21.20     0.13       4.55
--------------------------------------------------------------------------------------------
                            VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1979     TEMP: 75.0(F)      0.803/0.058/0.058/0.045/0.031/0.005
REGION: 49-STATE    19.6:19.6/19.6/19.6 MPH (19.6)      20.6/ 27.3/ 20.6

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1      LDT2      HDG      HDD       MC      ALL MODES
   TOTAL HC:    6.03     7.08     10.74     28.22     4.52     9.18       7.33
 EXHAUST  CO:  54.51    61.69     78.42    271.77    29.38    30.80      65.20
 EXHAUST NOx:   2.73     2.83      4.96     10.53    20.53     0.19       3.76
--------------------------------------------------------------------------------------------
```

4.6 Example 6: User-Supplied Mileage Accrual Data

```
0         IPROMT
EXAMPLE 6:  USER-SUPPLIED MILEAGE ACCRUAL DATA
1         INFLAG
0         SP3FLG
0         VMFLAG
1         MYMRFG                              <--INPUT FLAGS
0         ALTFLG
0         IMFLG
0         ALHFLG
0         TRKFLG_______________________________________
1         IFORM
0         PRTFLG                              <--OUTPUT FLAGS
0         ICEVFG
0         IDLFLG
0         NMHFLG
0         UNPFLG
0.1590.1500.1400.1310.1220.1130.1030.0940.0850.076  <--LDV ,AGES  1-10
0.0670.0660.0620.0590.0550.0510.0500.0470.0440.044  <--LDV ,AGES 11-20
0.1590.1500.1400.1310.1220.1130.1030.0940.0850.076  <--LDT1,AGES  1-10
0.0670.0660.0620.0590.0550.0510.0500.0470.0440.044  <--LDT1,AGES 11-20
0.1570.1570.1410.1260.1130.1020.0940.0860.0800.075  <--LDT2,AGES  1-10
0.0710.0660.0630.0600.0550.0520.0500.0470.0440.041  <--LDT2,AGES 11-20
0.1900.1900.1790.1650.1500.1350.1200.1060.0950.086  <--HDG ,AGES  1-10
0.0780.0700.0630.0590.0530.0490.0470.0460.0440.042  <--HDG ,AGES 11-20
0.7360.7360.6990.6330.5660.5000.4560.4120.3820.360  <--HDD ,AGES  1-10
0.3460.3380.3310.3240.3090.2870.2570.2130.1840.154  <--HDD ,AGES 11-20
.0201.0251.0207.0185.0172.0162.0155.0149.0143.0139  <--MC  ,AGES  1-10
.0135.0132.0129.0127.0125.0123.0122.0121.0120.0119  <--MC  ,AGES 11-20
1 83  5.0 75.0 20.6 27.3 20.6
1 83 10.0 75.0 20.6 27.3 20.6
1 83 15.0 75.0 20.6 27.3 20.6
1 83 20.0 75.0 20.6 27.3 20.6
1 83 25.0 75.0 20.6 27.3 20.6

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Col. 1
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CONTROL SECTION

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, MYMRFG=1, indicating that the user is supplying the annual rate of mileage accrual data. The 12 records preceding the scenario records supply this information.

The output for this example is listed on the following page.

EXAMPLE 6: USER-SUPPLIED MILEAGE ACCRUAL DATA

```
 *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
---------------------------------------------------------------------------------
                           VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.00
 REGION: 49-STATE      5.0: 5.0/ 5.0/ 5.0 MPH ( 5.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
               LDV      LDT1      LDT2      HDG       HDD       MC     ALL MOD
  TOTAL HC:   9.78     15.34     21.58     58.81      9.44    18.23       13.02
EXHAUST  CO: 111.81   182.24    245.62    531.63     73.27    71.72      141.16
EXHAUST NOx:   1.87     2.30      3.67      8.32     36.63     0.42        3.36
---------------------------------------------------------------------------------
                           VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     10.0:10.0/10.0/10.0 MPH (10.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
               LDV      LDT1      LDT2      HDG       HDD       MC     ALL MODES
  TOTAL HC:   5.49      8.51     12.20     38.40      7.06     9.33        7.60
EXHAUST  CO:  57.38    94.08    123.35    390.76     50.80    35.39       78.02
EXHAUST NOx:   1.76     2.15      3.30      8.82     28.33     0.42        3.01
---------------------------------------------------------------------------------
                           VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     15.0:15.0/15.0/15.0 MPH (15.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
               LDV      LDT1      LDT2      HDG       HDD       MC     ALL MODES
  TOTAL HC:   4.08      6.25      9.09     26.38      5.44     6.42        5.55
EXHAUST  CO:  40.44    66.60     84.35    301.67     36.63    23.89       56.06
EXHAUST NOx:   1.84     2.22      3.35      9.31     23.17     0.44        2.94
---------------------------------------------------------------------------------
                           VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     20.0:20.0/20.0/20.0 MPH (20.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
               LDV      LDT1      LDT2      HDG       HDD       MC     ALL MODES
  TOTAL HC:   3.41      5.18      7.66     18.99      4.32     5.37        4.49
EXHAUST  CO:  32.54    53.77     66.65    243.51     27.46    18.65       45.02
EXHAUST NOx:   2.00     2.41      3.63      9.81     20.03     0.46        3.02
---------------------------------------------------------------------------------
                           VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     25.0:25.0/25.0/25.0 MPH (25.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
               LDV      LDT1      LDT2      HDG       HDD       MC     ALL MODES
  TOTAL HC:   2.96      4.47      6.76     14.29      3.53     4.23        3.80
EXHAUST  CO:  27.15    44.95     55.53    204.79     21.39    15.40       37.58
EXHAUST NOx:   2.19     2.63      3.98     10.31     18.30     0.49        3.18
---------------------------------------------------------------------------------
```

4.7 Example 7: User-Supplied Vehicle Registration Data

```
0        IPRINT
EXAMPLE 7: USER-SUPPLIED VEHICLE REGISTRATION DATA
1        INFLAG
0        SPDFLG
0        VMFLAG                                <--INPUT FLAGS
2        MYMRFG
0        ALTFLG
0        IMFLG
0        ALHFLG
0        TBKFLG_________________________________________
1        IFORM
0        PRTFLG                                <--OUTPUT FLAGS
0        ICEVFG
0        IDLFLG
0        NMHFLG
0        UNFFLG
0.0750.1070.1070.1060.1000.0920.0850.0770.0660.052  <--LDV ,AGES  1-10
0.0390.0270.0180.0140.0090.0060.0050.0050.0050.004  <--LDV ,AGES 11-20
0.0610.0950.0940.1030.0830.0760.0760.0630.0540.043  <--LDT1,AGES  1-10
0.0360.0240.0300.0280.0260.0240.0220.0200.0180.016  <--LDT1,AGES 11-20
0.0370.0700.0780.0860.0750.0750.0750.0680.0590.053  <--LDT2,AGES  1-10
0.0440.0320.0380.0360.0340.0320.0300.0280.0260.024  <--LDT2,AGES 11-20
0.0370.0700.0780.0860.0750.0750.0750.0680.0590.053  <--HDG ,AGES  1-10
0.0440.0320.0380.0360.0340.0320.0300.0280.0260.024  <--HDG ,AGES 11-20
0.0770.1350.1340.1310.0990.0900.0820.0620.0450.033  <--HDD ,AGES  1-10
0.0250.0150.0130.0110.0100.0080.0070.0060.0050.004  <--HDD ,AGES 11-20
0.1050.2250.2060.1490.0970.0620.0460.0330.0290.023  <--MC  ,AGES  1-10
0.0080.0050.0130.0  0.0  0.0  0.0  0.0  0.0  0.0    <--MC  ,AGES 11-20
1 83  5.0 75.0 20.6 27.3 20.6
1 83 10.0 75.0 20.6 27.3 20.6
1 83 15.0 75.0 20.6 27.3 20.6
1 83 20.0 75.0 20.6 27.3 20.6
1 83 25.0 75.0 20.6 27.3 20.6

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Col. 1
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CONTROL SECTION

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, MYMRFG=2, indicating that the user is supplying the vehicle registration data. The 12 records preceding the scenario records supply this information.

The output for this example is listed on the following page.

```
EXAMPLE 7: USER-SUPPLIED VEHICLE REGISTRATION DATA

 *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
-------------------------------------------------------------------------------
                             VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
  CAL. YEAR: 1983     TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
  REGION: 49-STATE     5.0: 5.0/ 5.0/ 5.0 MPH ( 5.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS  (GM/MILE)
                LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    9.78    15.34     21.58     58.81      9.44    18.23       13.02
 EXHAUST  CO: 111.81   182.24    245.62    531.63     73.27    71.72      141.16
 EXHAUST NOx:   1.87     2.30      3.67      8.32     36.63     0.42        3.36
-------------------------------------------------------------------------------
                             VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
  CAL. YEAR: 1983     TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
  REGION: 49-STATE    10.0:10.0/10.0/10.0 MPH (10.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS  (GM/MILE)
                LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    5.49     8.51     12.20     38.40      7.06     9.33        7.60
 EXHAUST  CO:  57.38    94.08    123.35    390.76     50.80    35.39       78.02
 EXHAUST NOx:   1.76     2.15      3.30      8.82     28.33     0.42        3.01
-------------------------------------------------------------------------------
                             VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
  CAL. YEAR: 1983     TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
  REGION: 49-STATE    15.0:15.0/15.0/15.0 MPH (15.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS  (GM/MILE)
                LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    4.08     6.25      9.09     26.38      5.44     6.42        5.55
 EXHAUST  CO:  40.44    66.60     84.35    301.67     36.63    23.89       56.06
 EXHAUST NOx:   1.84     2.22      3.35      9.31     23.17     0.44        2.94
-------------------------------------------------------------------------------
                             VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
  CAL. YEAR: 1983     TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
  REGION: 49-STATE    20.0:20.0/20.0/20.0 MPH (20.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS  (GM/MILE)
                LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    3.41     5.18      7.66     18.99      4.32     5.07        4.49
 EXHAUST  CO:  32.54    53.77     66.65    243.51     27.46    18.65       45.02
 EXHAUST NOx:   2.00     2.41      3.63      9.81     20.03     0.46        3.02
-------------------------------------------------------------------------------
                             VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD   MC
  CAL. YEAR: 1983     TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
  REGION: 49-STATE    25.0:25.0/25.0/25.0 MPH (25.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS  (GM/MILE)
                LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    2.96     4.47      6.76     14.29      3.53     4.23        3.89
 EXHAUST  CO:  27.15    44.95     55.53    204.79     21.39    15.40       37.58
 EXHAUST NOx:   2.19     2.63      3.98     10.31     18.30     0.49        3.18
-------------------------------------------------------------------------------
```

4.8 Example 8: User-Supplied Mileage & Registration Data

```
0         IPROMT
EXAMPLE 8: USER-SUPPLIED MILEAGE & REGISTRATION DATA
1         INFLAG
0         SP3FLG
0         VMFLAG
0         MYMRFG                                  <--INPUT FLAGS
0         ALTFLG
0         IMFLG
0         ALHFLG
0         TBKFLG________________________________________________
1         IFORM
0         PRTFLG
0         ICEVFG                                  <--OUTPUT FLAGS
0         IDLFLG
0         NMHFLG
0         UNFFLG
0.1590.1500.1400.1310.1220.1130.1030.0940.0850.076   <--LDV ,AGES  1-10
0.0670.0660.0620.0590.0550.0510.0500.0470.0440.044   <--LDV ,AGES 11-20
0.1590.1500.1400.1310.1220.1130.1030.0940.0850.076   <--LDT1,AGES  1-10
0.0670.0660.0620.0590.0550.0510.0500.0470.0440.044   <--LDT1,AGES 11-20
0.1570.1570.1410.1260.1130.1020.0940.0860.0800.075   <--LDT2,AGES  1-10
0.0710.0660.0630.0600.0550.0520.0500.0470.0440.041   <--LDT2,AGES 11-20
0.1900.1900.1790.1650.1500.1350.1200.1060.0950.086   <--HDG ,AGES  1-10
0.0780.0700.0630.0590.0530.0490.0470.0460.0440.042   <--HDG ,AGES 11-20
0.7360.7360.6990.6330.5660.5000.4560.4120.3820.360   <--HDD ,AGES  1-10
0.3460.3380.3310.3240.3090.2870.2570.2130.1840.154   <--HDD ,AGES 11-20
.0201.0251.0207.0185.0172.0162.0155.0149.0143.0139   <--MC  ,AGES  1-10
.0135.0132.0129.0127.0125.0123.0122.0121.0120.0119   <--MC  ,AGES 11-20
0.0750.1070.1070.1060.1000.0920.0850.0770.0660.052   <--LDV ,AGES  1-10
0.0390.0270.0180.0140.0090.0060.0050.0050.0050.004   <--LDV ,AGES 11-20
0.0610.0950.0940.1030.0830.0760.0760.0630.0540.043   <--LDT1,AGES  1-10
0.0360.0240.0300.0280.0260.0240.0220.0200.0180.016   <--LDT1,AGES 11-20
0.0370.0700.0780.0860.0750.0750.0750.0680.0590.053   <--LDT2,AGES  1-10
0.0440.0320.0380.0360.0340.0320.0300.0280.0260.024   <--LDT2,AGES 11-20
0.0370.0700.0780.0860.0750.0750.0750.0680.0590.053   <--HDG ,AGES  1-10
0.0440.0320.0380.0360.0340.0320.0300.0280.0260.024   <--HDG ,AGES 11-20
0.0770.1350.1340.1310.0990.0900.0820.0620.0450.033   <--HDD ,AGES  1-10
0.0250.0150.0130.0110.0100.0080.0070.0060.0050.004   <--HDD ,AGES 11-20
0.1050.2250.2060.1490.0970.0620.0460.0330.0290.023   <--MC  ,AGES  1-10
0.0080.0050.0130.0  0.0  0.0  0.0  0.0  0.0  0.0     <--MC  ,AGES 11-20
 1 83  5.0 75.0 20.6 27.3 20.6
 1 83 10.0 75.0 20.6 27.3 20.6
 1 83 15.0 75.0 20.6 27.3 20.6
 1 83 20.0 75.0 20.6 27.3 20.6
 1 83 25.0 75.0 20.6 27.3 20.6

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CONTROL SECTION

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, MYMRPG=3, indicating that the user is supplying both the mileage accrual data and the vehicle registration data. The first 12 records in the ONE-TIME data section furnish the mileage accrual data, while the next 12 furnish the registration data.

The output for this example is listed on the following page.

EXAMPLE 8: USER-SUPPLIED MILEAGE & REGISTRATION DATA

```
 *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
--------------------------------------------------------------------------------
                              VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE      5.0: 5.0/ 5.0/ 5.0 MPH ( 5.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV     LDT1     LDT2     HDG      HDD      MC     ALL MODES
   TOTAL HC:    9.78    15.34    21.58    58.81     9.44   18.23      13.02
 EXHAUST  CO: 111.81   182.24   245.62   531.63    73.27   71.72     141.16
 EXHAUST NOx:   1.87     2.30     3.67     8.32    36.63    0.42       3.36
--------------------------------------------------------------------------------
                              VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     10.0:10.0/10.0/10.0 MPH (10.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV     LDT1     LDT2     HDG      HDD      MC     ALL MODES
   TOTAL HC:    5.49     8.51    12.20    38.40     7.06    9.33       7.60
 EXHAUST  CO:  57.38    94.08   123.35   390.76    50.80   35.39      78.02
 EXHAUST NOx:   1.76     2.15     3.30     8.82    28.33    0.42       3.01
--------------------------------------------------------------------------------
                              VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     15.0:15.0/15.0/15.0 MPH (15.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV     LDT1     LDT2     HDG      HDD      MC     ALL MODES
   TOTAL HC:    4.08     6.25     9.09    26.38     5.44    6.42       5.55
 EXHAUST  CO:  40.44    66.60    84.35   301.67    36.63   23.89      56.06
 EXHAUST NOx:   1.84     2.22     3.35     9.31    23.17    0.44       2.94
--------------------------------------------------------------------------------
                              VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     20.0:20.0/20.0/20.0 MPH (20.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV     LDT1     LDT2     HDG      HDD      MC     ALL MODES
   TOTAL HC:    3.41     5.18     7.66    18.99     4.32    5.07       4.49
 EXHAUST  CO:  32.54    53.77    66.65   243.51    27.46   18.65      45.02
 EXHAUST NOx:   2.00     2.41     3.63     9.81    20.03    0.46       3.02
--------------------------------------------------------------------------------
                              VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1983      TEMP: 75.0(F)        0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     25.0:25.0/25.0/25.0 MPH (25.0)      20.6/ 27.3/ 20.6

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV     LDT1     LDT2     HDG      HDD      MC     ALL MODES
   TOTAL HC:    2.96     4.47     6.76    14.29     3.53    4.23       3.80
 EXHAUST  CO:  27.15    44.95    55.53   204.79    21.39   15.40      37.58
 EXHAUST NOx:   2.19     2.63     3.98    10.31    18.30    0.49       3.18
--------------------------------------------------------------------------------
```

4.9 Example 9: Emission Factor Modification Data

```
0         IPROMT
EXAMPLE 9: EMISSION FACTOR MODIFICATION DATA
1         INFLAG
0         SPDFLG
0         VMFLAG
0         MYMRFG                                  <--INPUT FLAGS
1         ALTFLG
0         IMFLG
0         ALHFLG
0         TEKFLG__________________________________________________
1         IFORM
0         PRTFLG
0         ICEVFG                                  <--OUTPUT FLAGS
0         IDLFLG
0         NMHFLG
0         UNFFLG
 4
1  1  1 80 82    1.13    0.23
1  1  1 83 95    0.13    0.46
1  1  2 80 80   18.60    2.80
1  1  2 81 85    2.10    3.00
1 78  15.0 75.0 20.6 27.3 20.6
1 79  15.0 75.0 20.6 27.3 20.6
1 80  15.0 75.0 20.6 27.3 20.6
1 81  15.0 75.0 20.6 27.3 20.6
1 82  15.0 75.0 20.6 27.3 20.6
1 83  15.0 75.0 20.6 27.3 20.6
1 84  15.0 75.0 20.6 27.3 20.6

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Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, ALTFLG=1, indicating the user wishes to modify some of the basic emission factors. The five records immediately following the CONTROL SECTION supply the necessary information.

The first of these records supplies the number of modification records that follow it, in I2 format. The next four records supply the specific information required: low-altitude LDV HC factors for model years 1980-1982 will have a zero-mileage emission rate of 1.13 and a deterioration rate (per 10000 miles) of 0.23, both in gm/mi; for 1983-1995 these values are 0.13 and 0.46. The low-altitude LDV CO factor for 1980 consists of a zero-mileage rate of 18.60 and a deterioration rate of 2.80; for model years 1981-1985, these values are 2.10 and 3.00.

The output for this example is listed on the following page.

```
EXAMPLE 9: EMISSION FACTOR MODIFICATION DATA

   EMISSION FACTOR MODIFICATION PROFILE:
REGION  MODE  POLLUTANT  FIRST MY  LAST MY     BASE     DEL   ALTERED
   1      1       1        1980      1982       1.13    0.23    YES
   1      1       1        1983      1995       0.13    0.46    YES
   1      1       2        1980      1980      18.60    2.80    YES
   1      1       2        1981      1985       2.10    3.00    YES

  *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
------------------------------------------------------------------------------
                          VEH. TYPE:  LDV   LDT1  LDT2   HDG    HDD    MC
  CAL. YEAR: 1978     TEMP: 75.0(F)     0.803/0.058/0.058/0.045/0.031/0.005
  REGION: 49-STATE    15.0:15.0/15.0/15.0 MPH (15.0)       20.6/ 27.3/ 20.6

                  COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1     LDT2     HDG      HDD      MC     ALL MODES
   TOTAL HC:    7.76     8.87    12.99    39.51     5.31    13.00       9.51
 EXHAUST  CO:  72.56    79.22   101.03   356.75    38.42    42.68      86.17
 EXHAUST NOx:   2.74     2.86     4.87    10.25    22.92     0.14       3.82
------------------------------------------------------------------------------
                          VEH. TYPE:  LDV   LDT1  LDT2   HDG    HDD    MC
  CAL. YEAR: 1979     TEMP: 75.0(F)     0.803/0.058/0.058/0.045/0.031/0.005
  REGION: 49-STATE    15.0:15.0/15.0/15.0 MPH (15.0)       20.6/ 27.3/ 20.6

                  COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1     LDT2     HDG      HDD      MC     ALL MODES
   TOTAL HC:    7.06     8.32    12.41    37.90     5.36    11.10       8.80
 EXHAUST  CO:  67.83    76.42    98.82   350.40    37.63    38.11      81.76
 EXHAUST NOx:   2.56     2.66     4.63    10.11    22.89     0.18       3.64
------------------------------------------------------------------------------
                          VEH. TYPE:  LDV   LDT1  LDT2   HDG    HDD    MC
  CAL. YEAR: 1980     TEMP: 75.0(F)     0.803/0.058/0.058/0.045/0.031/0.005
  REGION: 49-STATE    15.0:15.0/15.0/15.0 MPH (15.0)       20.6/ 27.3/ 20.6

                  COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1     LDT2     HDG      HDD      MC     ALL MODES
   TOTAL HC:    6.39     7.75    11.56    35.17     5.45     9.53       8.05
 EXHAUST  CO:  63.47    73.85    95.35   340.90    37.12    34.06      77.44
 EXHAUST NOx:   2.41     2.48     4.26     9.89    22.95     0.24       3.49
------------------------------------------------------------------------------
                          VEH. TYPE:  LDV   LDT1  LDT2   HDG    HDD    MC
  CAL. YEAR: 1981     TEMP: 75.0(F)     0.803/0.058/0.058/0.045/0.031/0.005
  REGION: 49-STATE    15.0:15.0/15.0/15.0 MPH (15.0)       20.6/ 27.3/ 20.6

                  COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1     LDT2     HDG      HDD      MC     ALL MODES
   TOTAL HC:    5.77     7.19    10.72    32.31     5.53     8.26       7.34
 EXHAUST  CO:  57.17    71.46    91.87   331.34    36.85    30.00      71.58
 EXHAUST NOx:   2.20     2.36     3.92     9.66    23.03     0.33       3.28
------------------------------------------------------------------------------
                          VEH. TYPE:  LDV   LDT1  LDT2   HDG    HDD    MC
  CAL. YEAR: 1982     TEMP: 75.0(F)     0.803/0.058/0.058/0.045/0.031/0.005
```

```
REGION: 49-STATE     15.0:15.0/15.0/15.0 MPH (15.0)      20.6/ 27.3/ 20.6

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1      LDT2      HDG       HDD        MC      ALL MODES
   TOTAL HC:      5.23      6.72      9.87     29.23      5.61      7.43        6.69
EXHAUST  CO:     50.56     69.57     88.27    321.65     36.72     27.29       65.50
EXHAUST NOx:      1.99      2.27      3.60      9.46     23.12      0.39        3.09
------------------------------------------------------------------------------------
                                VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1983     TEMP: 75.0(F)          0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE    15.0:15.0/15.0/15.0 MPH (15.0)      20.6/ 27.3/ 20.6

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1      LDT2      HDG       HDD        MC      ALL MODES
   TOTAL HC:      4.66      6.25      9.09     26.38      5.44      6.42        6.02
EXHAUST  CO:     44.87     66.60     84.35    301.67     36.63     23.89       59.61
EXHAUST NOx:      1.84      2.22      3.35      9.31     23.17      0.44        2.9[illegible]
------------------------------------------------------------------------------------
                                VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1984     TEMP: 75.0(F)          0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE    15.0:15.0/15.0/15.0 MPH (15.0)      20.6/ 27.3/ 20.6

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1      LDT2      HDG       HDD        MC      ALL MODES
   TOTAL HC:      4.20      5.76      8.28     23.59      5.10      4.66        5.43
EXHAUST  CO:     40.23     62.54     79.09    272.49     36.58     18.08       54.01
EXHAUST NOx:      1.71      2.19      3.14      9.19     23.22      0.46        2.82
------------------------------------------------------------------------------------
```

4.10 Example 10: LDV Inspection/Maintenance

CONTROL SECTION

```
0        IPROMT
EXAMPLE 10: LDV INSPECTION/MAINTENANCE
1        INFLAG
0        SP3FLG
0        VMFLAG
0        MYMRFG                            <--INPUT FLAGS
0        ALTFLG
1        IMFLG
0        ALHFLG
0        TRKFLG_________________________________________
1        IFORM
0        PRTFLG
0        ICEVFG                            <--OUTPUT FLAGS
0        IDLFLG
0        NMHFLG
0        UNFFLG
79 30 1 68 99                                 <--I/M PARAMETERS
1 75 23.0 75.0 20.6 27.3 20.6
1 80 23.0 75.0 20.6 27.3 20.6
1 85 23.0 75.0 20.6 27.3 20.6

^
|
|
Col. 1
```

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, IMFLG=1, indicating that the user wants to include the impact of a LDV Inspection/Maintenance program in the composite factors. This option requires one record in the ONE-TIME DATA SECTION, as shown above.

The output for this example is listed on the following page.

EXAMPLE 10: LDV INSPECTION/MAINTENANCE

```
 *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
------------------------------------------------------------------------------------
                               VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1975      TEMP: 75.0(F)         0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)       20.6/ 27.3/ 20.6
  LDV I/M PROGRAM STARTING IN 1979, STRINGENCY LEVEL 30%, MECH. TRAINING: Y
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1968 THROUGH 1999

                          COMPOSITE EMISSION FACTORS  (GM/MILE)
                LDV       LDT1       LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    7.60      8.27      11.70     24.59      3.92     10.45        8.54
 EXHAUST  CO:  59.33     62.03      73.33    232.11     28.40     32.39       66.98
 EXHAUST NOx:   3.75      3.74       5.82     11.07     20.01      0.14        4.68
------------------------------------------------------------------------------------
                               VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1980      TEMP: 75.0(F)         0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)       20.6/ 27.3/ 20.6
  LDV I/M PROGRAM STARTING IN 1979, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1968 THROUGH 1999

                          COMPOSITE EMISSION FACTORS  (GM/MILE)
                LDV       LDT1       LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    4.44      5.99       9.21     21.70      4.02      6.96        5.58
 EXHAUST  CO:  33.49     52.77      66.48    230.67     24.41     24.08       45.07
 EXHAUST NOx:   2.74      2.81       4.86     10.64     19.21      0.26        3.72
------------------------------------------------------------------------------------
                               VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1985      TEMP: 75.0(F)         0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)       20.6/ 27.3/ 20.6
  LDV I/M PROGRAM STARTING IN 1979, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1968 THROUGH 1999

                          COMPOSITE EMISSION FACTORS  (GM/MILE)
                LDV       LDT1       LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    1.60      3.97       5.76     12.57      3.30      2.33        2.53
 EXHAUST  CO:  10.87     42.28      52.07    180.90     23.29      9.48       23.11
 EXHAUST NOx:   1.68      2.38       3.31      9.60     17.35      0.48        2.81
------------------------------------------------------------------------------------
```

4.11 Example 11: Additional LDV Correction Factors

CONTROL SECTION

```
0         IPRONT
EXAMPLE 11: ADDITIONAL LDV CORRECTION FACTORS
1         INFLAG
0         SPDFLG
0         VMFLAG
0         MYMRFG                                  <--INPUT FLAGS
0         ALTFLG
0         IMFLG
1         ALHFLG
0         TRKFLG____________________________________
1         IFORM
0         PRTFLG
0         ICEVFG                                 <--OUTPUT FLAGS
0         IDLFLG
0         NMHFLG
0         UNFFLG
1 75 23.0 75.0 20.6 27.3 20.6                    <--LCOP 1,EF PARAMETERS
0.40 .08 .12 .14 .09 83.                         <--LCOP 1,ALHFLG PARAMETERS
1 80 23.0 75.0 20.6 27.3 20.6                    <--LCOP 2,EF PARAMETERS
0.40 .08 .12 .14 .09 83.                         <--LCOP 2,ALHFLG PARAMETERS
1 85 23.0 75.0 20.6 27.3 20.6                    <--LCOP 3,EF PARAMETERS
0.40 .08 .12 .14 .09 83.                         <--LCOP 3,ALHFLG PARAMETERS

^
|
|
Col. 1
```

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, ALHFLG=1, indicating that the user wants to include the additional LDV correction factors in the calculation. This option requires an additional record for each scenario record. This record follows the scenario record to which it applies, and supplies the parameters required to calculate these additional factors.

The output for this example is listed on the following page.

EXAMPLE 11: ADDITIONAL LDV CORRECTION FACTORS

```
 *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
---------------------------------------------------------------------------------
                                 VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1975      TEMP: 75.0 (F)           0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)       20.6/ 27.3/ 20.6
  AC:  0.40  XLOAD:    0.08    0.12    0.14  TRAILR:    0.09  ABSHUM:  83.00

                          COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV       LDT1       LDT2      HDG       HDD        MC      ALL MODES
   TOTAL HC:    7.99      8.52      11.76     24.59      3.92     10.45        8.87
 EXHAUST  CO:  70.18     66.73      75.38    232.11     28.40     32.39       76.08
 EXHAUST NOx:   3.87      3.81       5.62     11.07     20.01      0.14        4.77
---------------------------------------------------------------------------------
                                 VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1980      TEMP: 75.0 (F)           0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)       20.6/ 27.3/ 20.6
  AC:  0.40  XLOAD:    0.08    0.12    0.14  TRAILR:    0.09  ABSHUM:  83.00

                          COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV       LDT1       LDT2      HDG       HDD        MC      ALL MODES
   TOTAL HC:    5.14      6.19       9.26     21.70      4.02      6.96        6.16
 EXHAUST  CO:  53.26     56.99      68.34    230.67     24.41     24.08       61.30
 EXHAUST NOx:   2.86      2.86       4.69     10.64     19.21      0.26        3.81
---------------------------------------------------------------------------------
                                 VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1985      TEMP: 75.0 (F)           0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)       20.6/ 27.3/ 20.6
  AC:  0.40  XLOAD:    0.08    0.12    0.14  TRAILR:    0.09  ABSHUM:  83.00

                          COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV       LDT1       LDT2      HDG       HDD        MC      ALL MODES
   TOTAL HC:    2.61      4.14       5.80     12.57      3.30      2.33        3.35
 EXHAUST  CO:  28.55     45.76      53.52    180.90     23.29      9.48       37.60
 EXHAUST NOx:   1.97      2.43       3.20      9.60     17.35      0.48        2.88
---------------------------------------------------------------------------------
```

4.12 Example 12: Additional HDV Correction Factor

```
                                                                     C
0        IPROMT                                                      O
EXAMPLE 12: ADDITIONAL HDV CORRECTION FACTOR                         N
1        INFLAG                                                      T
0        SP3FLG                                                      R
0        VMFLAG                          <--INPUT FLAGS              O
0        MYMRFG                                                      L
0        ALTFLG
0        IMFLG
0        ALHFLG                                                      S
1        TRKFLG__________________________________________            E
1        IFORM                                                       C
0        PRTFLG                          <--OUTPUT FLAGS             T
0        ICEVFG                                                      I
0        IDLFLG                                                      O
0        NMHFLG                                                      N
0        UNFFLG                          <--LOOP 1,EF PARAMETERS
1 75 23.0 75.0 20.6 27.3 20.6            <--LOOP 1,TRKFLG PARAMETERS
2500044000 350. 555.                     <--LOOP 2,EF PARAMETERS
1 80 23.0 75.0 20.6 27.3 20.6            <--LOOP 2,TRKFLG PARAMETERS
2500044000 350. 555.                     <--LOOP 3,EF PARAMETERS
1 85 23.0 75.0 20.6 27.3 20.6            <--LOOP 3,TRKFLG PARAMETERS
2500044000 350. 555.

^
|
|
Col. 1
```

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, TRKFLG=1, indicating that the user wants to include the additional HDV correction factor in the calculation. This option requires an additional record for each scenario record. This record follows the scenario record to which it applies, and supplies the weight and engine displacement values required to calculate this additional correction factor.

The output for this example is listed on the following page.

EXAMPLE 12: ADDITIONAL HDV CORRECTION FACTOR

```
 *   TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
---------------------------------------------------------------------------------------
                                 VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1975      TEMP: 75.0(F)          0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)        20.6/ 27.3/ 20.6
  HGWGT: 25000.  HDWGT: 44000.  HGCID: 350.00  HDCID: 555.00

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1      LDT2      HDG       HDD       MC      ALL MOD
   TOTAL HC:     7.60      8.27     11.70     30.84      3.25     10.45       8.80
 EXHAUST  CO:   59.33     62.03     73.33    258.71     42.23     32.39      68.60
 EXHAUST NOx:    3.75      3.74      5.82     11.22     23.05      0.14       4.78
---------------------------------------------------------------------------------------
                                 VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1980      TEMP: 75.0(F)          0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)        20.6/ 27.3/ 20.6
  HGWGT: 25000.  HDWGT: 44000.  HGCID: 350.00  HDCID: 555.00

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:     4.85      5.99      9.21     21.38      4.12      6.96       5.90
 EXHAUST  CO:   43.36     52.77     66.48    220.32     32.12     24.08      52.77
 EXHAUST NOx:    2.74      2.81      4.86      6.11     23.28      0.26       3.65
---------------------------------------------------------------------------------------
                                 VEH. TYPE:  LDV    LDT1  LDT2   HDG    HDD    MC
 CAL. YEAR: 1985      TEMP: 75.0(F)          0.803/0.058/0.058/0.045/0.031/0.005
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)        20.6/ 27.3/ 20.6
  HGWGT: 25000.  HDWGT: 44000.  HGCID: 350.00  HDCID: 555.00

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:     2.43      3.97      5.76     11.22      3.51      2.33       3.14
 EXHAUST  CO:   22.51     42.28     52.07    161.40     29.60      9.48      31.77
 EXHAUST NOx:    1.88      2.38      3.31      3.84     21.26      0.48       2.67
---------------------------------------------------------------------------------------
```

4.13 Example 13: All Flags Set

```
1         IPRONT
EXAMPLE 13: ALL FLAGS SET
1         INFLAG
1         SP3FLG
1         VMFLAG                                   <--INPUT FLAGS
2         MYMRFG
1         ALTFLG
1         IMFLG
1         ALHFLG
1         TRKFLG________________________________________
1         IFORM
1         PRTFLG                                  <--OUTPUT FLAGS
1         ICEVFG
1         IDLFLG
1         NMHFLG
1         UNFFLG
0.0750.1070.1070.1060.1000.0920.0850.0770.0660.052  <--LDV ,AGES  1-10
0.0390.0270.0180.0140.0090.0060.0050.0050.0050.004  <--LDV ,AGES 11-20
0.0610.0950.0940.1030.0830.0760.0760.0630.0540.043  <--LDT1,AGES  1-10
0.0360.0240.0300.0280.0260.0240.0220.0200.0180.016  <--LDT1,AGES 11-20
0.0370.0700.0780.0860.0750.0750.0750.0680.0590.053  <--LDT2,AGES  1-10
0.0440.0320.0380.0360.0340.0320.0300.0280.0260.024  <--LDT2,AGES 11-20
0.0370.0700.0780.0860.0750.0750.0750.0680.0590.053  <--HDG ,AGES  1-10
0.0440.0320.0380.0360.0340.0320.0300.0280.0260.024  <--HDG ,AGES 11-20
0.0770.1350.1340.1310.0990.0900.0820.0620.0450.033  <--HDD ,AGES  1-10
0.0250.0150.0130.0110.0100.0080.0070.0060.0050.004  <--HDD ,AGES 11-20
0.1050.2250.2060.1490.0970.0620.0460.0330.0290.023  <--MC  ,AGES  1-10
0.0080.0050.0130.0  0.0  0.0  0.0  0.0  0.0  0.0    <--MC  ,AGES 11-20
                                        <--EF MODIFICATION DATA
 4                                      <--EF MODIFICATION DATA
1 1 1 80 82   1.13   0.23               <--EF MODIFICATION DATA
1 1 1 83 95   0.13   0.46               <--EF MODIFICATION DATA
1 1 2 80 80  18.60   2.80               <--EF MODIFICATION DATA
1 1 2 81 85   2.10   3.00                    <--I/M PARAMETERS
79 30 1 68 99
1 75 23.0 18.7 21.3 75.0 20.6 27.3 20.6  <--LCOP 1,EF PARAMETERS
.657.083.057.115.079.009                 <--LCOP 1,VMT MIX
0.40 .08 .12 .14 .09 83.                 <--LCOP 1,ALHFLG PARAMETERS
2500044000 350. 555.                     <--LCOP 1,TRKFLG PARAMETERS
1 80 23.0 18.7 21.3 75.0 20.6 27.3 20.6  <--LCOP 2,EF PARAMETERS
.657.083.057.115.079.009                 <--LCOP 2,VMT MIX
0.40 .08 .12 .14 .09 83.                 <--LCOP 2,ALHFLG PARAMETERS
2500044000 350. 555.                     <--LCOP 2,TRKFLG PARAMETERS
1 85 23.0 18.7 21.3 75.0 20.6 27.3 20.6  <--LCOP 3,EF PARAMETERS
.657.083.057.115.079.009                 <--LCOP 3,VMT MIX
0.40 .08 .12 .14 .09 83.                 <--LCOP 3,ALHFLG PARAMETERS
2500044000 350. 555.                     <--LCOP 3,TRKFLG PARAMETERS

^
|
|
Col. 1
```

CONTROL SECTION

ONE/TIME DATA SEC.

EF PARAM SEC

Please note that the name labels on Record 1 and Records 2-16 are not part of the input data.

In this example, all flags are set, although not all of them affect the format of the input data set.

The output for this example is listed on the following page.

```
ENTER PROJECT ID:
ENTER INFLAG:
ENTER SP3FLG:
ENTER VMFLAG:
ENTER MYMRFG:
ENTER ALTFLG:
ENTER IMFLG:
ENTER ALHFLG:
ENTER TRKFLG:
ENTER IFORM:
ENTER PRTFLG:
ENTER ICEVFG:
ENTER IDLFLG:
ENTER NMHFLG:
ENTER UNFFLG:

ENTER NO. OF NEW E.F. INTERCEPT/SLOPE PAIRS (I2)
ENTER REGION,VEH. TYPE,POLLUTANT,FIRST MY,
LAST MY,NEW INTERCEPT (A), AND NEW SLOPE (B)
ENTER REGION,VEH. TYPE,POLLUTANT,FIRST MY,
LAST MY,NEW INTERCEPT (A), AND NEW SLOPE (B)
ENTER REGION,VEH. TYPE,POLLUTANT,FIRST MY,
LAST MY,NEW INTERCEPT (A), AND NEW SLOPE (B)
ENTER REGION,VEH. TYPE,POLLUTANT,FIRST MY,
LAST MY,NEW INTERCEPT (A), AND NEW SLOPE (B)

ENTER YEAR I/M BEGINS, STRINGENCY, M.T. FLAG,
FIRST MODEL YEAR AND LAST MODEL YEAR OF PROGRAM BENEFITS

ENTER REGION, CY,SPD(3),TEMP,PCCO,PCHS,PCCC:

ENTER VMT SPLIT:

ENTER AC,XLOAD(3),TRAILR,ABSHUM

ENTER HGWGT,HDWGT,HGCID,HDCID
```

(N.B. The lines above are input prompts as generated in batch mode.)

EXAMPLE 13: ALL FLAGS SET

```
   EMISSION FACTOR MODIFICATION PROFILE:
REGION  MODE  POLLUTANT  FIRST MY  LAST MY     BASE     DEL  ALTERED
   1      1        1        1980     1982      1.33     0.23    YES
   1      1        1        1983     1995      0.13     0.46    YES
   1      1        2        1980     1980     18.60     2.80    YES
   1      1        2        1981     1985      2.30     3.00    YES

  *NON METH HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS
------------------------------------------------------------------------------
                           VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1975     TEMP: 75.0(F)         0.657/0.083/0.057/0.115/0.079/0.009
 REGION: 49-STATE    23.0/18.7/21.3 MPH (18.7)            20.6/ 27.3/ 20.6
  AC:  0.40  XLOAD:    0.08   0.12   0.14  TRAILR:   0.09  ABSHUM:   83.00
  HGWGT: 25000.  HDWGT: 44000.  HGCID: 350.00  HDCID: 555.00
  LDV I/M PROGRAM STARTING IN 1979, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1968 THROUGH 1999

                   COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV       LDT1       LDT2       HDG       HDD        MC      ALL MODES
NON-METH HC:  8.15      8.69      11.94      37.77      3.71     10.71      11.49
   *EVAP HC:  2.26      2.50       4.00       3.42      0.0       1.60      ----

               HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:  1.96      2.14       3.64       3.88      0.47      4.25       2.19
   IDLE  CO: 28.69     30.02      37.05      42.11      1.14      8.96      28.46
   IDLE NOx:  0.23      0.21       0.23       0.03      1.08      0.01       0.27
------------------------------------------------------------------------------

ENTER REGION, CY,SPD(3),TEMP,PCCO,PCHS,PCCC:

ENTER VMT SPLIT:

ENTER AC,XLOAD(3),TRAILR,ABSHUM

ENTER HGWGT,HDWGT,HGCID,HDCID
                           VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1980     TEMP: 75.0(F)         0.657/0.083/0.057/0.115/0.079/0.009
 REGION: 49-STATE    23.0/18.7/21.3 MPH (18.7)            20.6/ 27.3/ 20.6
  AC:  0.40  XLOAD:    0.08   0.12   0.14  TRAILR:   0.09  ABSHUM:   83.00
  HGWGT: 25000.  HDWGT: 44000.  HGCID: 350.00  HDCID: 555.00
  LDV I/M PROGRAM STARTING IN 1979, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1968 THROUGH 1999

                   COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV       LDT1       LDT2       HDG       HDD        MC      ALL MODES
NON-METH HC:  4.79      6.16       9.39      25.84      4.72      7.20       7.60
   *EVAP HC:  1.36      1.51       2.74       2.51      0.0       0.63      ----

               HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:  1.20      1.73       3.12       3.92      0.42      3.07       1.62
   IDLE  CO: 18.21     20.53      34.99      43.62      0.76      6.73      20.80
   IDLE NOx:  0.37      0.26       0.24       0.02      1.01      0.02       0.36
```

```
------------------------------------------------------------------------------

ENTER REGION, CY,SPD(3),TEMP,PCCO,PCHS,PCCC:

ENTER VMT SPLIT:

ENTER AC,XLOAD(3),TRAILR,ABSHUM

ENTER HGWGT,HDWGT,HGCID,HDCID
                           VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1985     TEMP: 75.0(F)       0.657/0.083/0.057/0.115/0.079/0.009
 REGION: 49-STATE    23.0/18.7/21.3 MPH (18.7)          20.6/ 27.3/ 20.6
  AC:  0.40  XLOAD:   0.08   0.12   0.14  TRAILR:   0.09  ABSHUM:  83.00
  HGWGT: 25000.  HDWGT: 44000.  HGCID: 350.00  HDCID: 555.00
  LDV I/M PROGRAM STARTING IN 1979, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1968 THROUGH 1999

                     COMPOSITE EMISSION FACTORS (GM/MILE)
               LDV      LDT1      LDT2      HDG      HDD       MC      ALL MODES
NON-METH HC:   1.92     3.99      5.76     13.74     4.16     2.43        3.85
   *EVAP HC:   0.48     0.59      1.13      1.22     0.0      0.09        ----

                  HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:    0.45     1.38      2.10      2.93     0.34     1.13        0.91
  IDLE  CO:    5.90    13.58     22.74     39.42     0.68     2.65       10.91
  IDLE  NOx:   0.45     0.25      0.23      0.02     0.92     0.03        0.40
------------------------------------------------------------------------------

ENTER REGION, CY,SPD(3),TEMP,PCCO,PCHS,PCCC:
```

V. PROGRAMMING CONSIDERATIONS

5.1 Program Storage Requirements

The variety of computers and system configurations in use precludes the precise statement of main storage requirements. Nevertheless, the following should reflect MOBILE1's requirements on most systems. On EPA's Washington computer, an IBM 370/158 Mod I, MOBILE1 requires 200 Kilobytes of main storage (using the standard convention of 1 Kilobyte = 1024 bytes). MOBILE1 can be easily modified to run in a considerably smaller region, although at the expense of increased execution time.

5.2 Program Compilation

MOBILE1 will compile and execute without any modifications using either a FORTRAN G1 or H Extended compiler (the latter with the OPT(0) compile option). The use of other compilers may require modification of a few statements in the program. The most likely change would be the elimination of the list-directed READ statements in SUBROUTINE INPUT. (These statements have the form READ(INBI,*) ....) If these statements are eliminated, MOBILE1 should be executed with INFLAG set equal to 1.

5.3 Timing Considerations

For the reasons stated in #1 above, and also because of variable contention in interactive systems and paging overhead in Virtual Storage computers, precise timing estimates cannot be given. However, on the system described above, MOBILE1 required 47 seconds of CPU time to analyze a 1000 link input data set.

5.4 Reading INDATA1 and INDATA2

The sample input data sets INDATA1 and INDATA2, which were supplied with copies of MOBILE1, cannot be correctly read using the formatted READ statement in SUBROUTINE INPUT. To read INDATA1 or INDATA2 correctly, alter FORMAT statement 725 to:

```
725    FORMAT(I1,1X,I2,1X,F4.1,1X,F2.0,3(1X,F5.2))
```

5.5 Job Control Language for MOBILE1

The following Job Control Language (JCL) is appropriate for running a MOBILE1 job in a batch environment using an IBM FORTRAN

G1 compiler:

```
//MOBILE1 EXEC FTG1CLG,PRINT=F,CREGION=200K,GREGION=200K
//FORT.SYSIN DD *
                 .
     (MOBILE1 Source Deck)
                 .
/*
//GO.SYSIN DD *
                 .
     (MOBILE1 Input Data)
                 .
/*
```

The user should keep in mind that PROCLIB procedure organization is system-dependent.

5.6 Modifications for January 1 factors

The emission factors generated by MOBILE1 represent vehicle emissions on July 1 of the calendar year. The user, may, however, wish to compute emission factors representative of the beginning of the calendar year. This section presents two methods for generating beginning-of-year factors.

1. Interpolation

To compute composite emission factors for the beginning of a calendar year, say 1980, the user merely computes the mid-year emission factors for calendar years 1979 and 1980, and interpolates between them. This method does not take into account the shift in vehicle registration distributions between the start and the middle of the year. Nevertheless, given the uncertainties associated with emission factors and input data, it is quite acceptable.

2. Program Modification

The user may explicitly compute beginning-of-year factors using MOBILE1 by making one minor program modification and then running the program with a particular control flag value.

The program modification merely entails replacing the following DATA statement which appears starting on the seventh line of SUBROUTINE GETCUM:

```
      DATA FRAC/
     *          .75 , .375 , .25 , .875 ,
     *          .75 , .375 , .25 , .875 ,
     *          .75 , .375 , .25 , .875 ,
     *          .50 , .25  , .50 , .75  ,
     *          .50 , .25  , .50 , .75  ,
     *          .50 , .25  , .50 , .75     /
```

with the following:

```
      DATA FRAC/
     *          .25 , .125 , .75 , .625 ,
     *          .25 , .125 , .75 , .625 ,
     *          .25 , .125 , .75 , .625 ,
     *         0.00 ,0.00  ,1.00 , .50  ,
     *         0.00 ,0.00  ,1.00 , .50  ,
     *         0.00 ,0.00  ,1.00 , .50     /
```

In addition to making this program modification, the user must run MOBILE1 with MYMFG=2 (or [illegible]=3) and must supply vehicle registration distributions for the beginning of the year. It should be noted that most available vehicle registration data is representative of the middle of the year. As a result, this data requirement may be difficult to fulfill, making the first method more desirable.

5.7 Altitude correction for intermediate altitudes

The HIGH ALTITUDE emission factors which MOBILE1 can generate are intended for use in emission calculations at altitudes of 4000 feet and higher. The LOW-ALTITUDE emission factors represent emissions at sea level.

For altitudes below 4000 feet, the user may still wish to take into account the variations in emissions due to altitude. This can be done by linearly interpolating between the emission factors computed for IREJN=1 (low-altitude) and the emission factors computed for IREJN=3 (high-altitude).

VI. DESCRIPTION OF MOBILE1 ROUTINES

MOBILE1 consists of a MAIN routine and 19 subprograms. Fourteen of the subprograms are subroutine subprograms; the other five are BLOCK DATA subprograms, which are used for initialization of arrays in named COMMON blocks. The routines are described below.

6.1 MAIN Routine

The Main routine controls overall program execution. It consists of a sequence of subroutine calls.

MAIN first initiates "housekeeping" operations by a call to INPUT. It then proceeds through a series of subroutine calls which are listed below:

1. INPUT - to read input data describing desired calculation.
2. EFCALX - to calculate composite emission factors.
3. OUTPUT - to output the factors

This sequence of calls is repeated until the input data set is exhausted. There are two optional subroutine calls between the call to INPUT and the call to EFCALX which generate model-year emission factors when appropriate.

6.2 SUBROUTINE INPUT

INPUT reads the input data for MOBILE1. It optionally prompts for this data, if the appropriate flag is set.

6.3 SUBROUTINE OUTPUT

OUTPUT writes the computed composite emission factors. It creates a formatted data set in one of two user-selectable formats. If the appropriate flag is set, an unformatted output data set is also created.

6.4 SUBROUTINE EFCALX

EFCALX computes the composite emission factors. It first calls BIGCFX, which computes the speed/temperature/cold start correction factors.

6.5 SUBROUTINE BIGCFX

BIGCFX computes the speed/temperature/cold start correction factors which are used in the calculation of factors for autos, light-duty trucks, and motorcycles. It also computes the speed correction factors for heavy duty gas and diesel vehicle emission factors.

BIGCFX optionally calls ALUH and TRKOPC, which compute the optional light-duty vehicle and heavy-duty vehicle correction factors.

BIGCFX calls SPFCLX, which computes the speed portion of the correction factor.

6.6 SUBROUTINE INITEX

INITEX is a 'housekeeping' routine which is called once when MOBILE1 begins execution. It will be called again only if the user changes the REGION specification during a run.

INITEX consists of three subroutine calls:

1 - EFALTX, optionally called to modify model-year factors.

2 - BEFGEN, to generate model-year emission factors.

3 - CCEVAX, to generate HC crankcase and evaporative factors.

6.7 SUBROUTINE TFCALX

TFCALX computes the travel factor, which is used to weight the relative contribution of each model year to the composite emission factor according to the relative VMT contribution of each model year's vehicles.

6.8 SUBROUTINE SPFCLX

SPFCLX calculates the speed portion of the speed/temperature/cold-start correction factor used for autos, light trucks, and motorcycles.

6.9 SUBROUTINE BEFGEN

BEFGEN generates the basic model-year emission factors using the appropriate zero-mileage emission rates, rates of deterioration per 10000 miles, and average cumulative mileages. The cumulative mileages are generated by GETCUM, which is called from BEFGEN.

6.10 SUBROUTINE GETCUM

GETCUM calculates the average mid-year cumulative mileages as a function of vehicle age.

These values are used in BEFGEN for computing model-year emission factors, and in BIGCFX for computing speed/temperature/cold-start correction factors.

6.11 SUBROUTINE EFALTX

EFALTX is designed to allow the user to modify the model-year emission factors used in computing the composite emission factors. This would be useful, for example, in estimating the impacts of changes in new vehicle emission standard timetables.

6.12 SUBROUTINE CCEVAX

CCEVAX generates the HC crankcase and evaporative emission factors which are added to the running emission factors in the computation of the HC composite emission factors.

6.13 SUBROUTINE LDVIMX

LDVIMX computes the impact of an inspection/maintenance program on light-duty vehicle emission factors.

6.14 SUBROUTINE ALUH

ALUH computes four correction factors for light-duty vehicles and light-duty trucks:

1. Air-conditioning correction factor.
2. Loading correction factor.
3. Trailer towing correction factor.
4. Humidity correction factor (applies to NOx only).

6.15 SUBROUTINE TRKOPC

TRKOPC computes the truck characteristic correction factor for heavy duty gas and diesel vehicles. This correction factor is a function of the weight/power ratio.

6.16 SUBROUTINE BDSPD

This BLOCK DATA subprogram contains the polynomial coefficients for the power series used in computing the speed correction factors for autos, light trucks, and motorcycles.

6.17 SUBROUTINE BDMYMR

This BLOCK DATA subprogram contains the national average VMT split distribution, registration distributions, and average mileage accumulation distributions.

6.18 SUBROUTINE BDE123

This BLOCK DATA subprogram contains zero mileage emission rates and deterioration rates for exhaust emission factors.

6.19 SUBROUTINE BDI123

This BLOCK DATA subprogram contains zero mileage emission rates and deterioration rates for idle emission factors.

6.20 SUBROUTINE BDIM

This BLOCK DATA subprogram contains the basic HC and CO emission reduction percentages used in computing the impact of inspection/maintenance programs on composite emissions.

APPENDIX A: MOBILE1 PROGRAM LISTING

A.1 MAIN

```
C**************************************************************************
C
C
C
C           MOBILE1: MOBILE SOURCE EMISSIONS MODEL
C
C
C
C
C              UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
C
C              OFFICE OF AIR AND WASTE MANAGEMENT
C              OFFICE OF TRANSPORTATION AND LAND USE POLICY
C              401 M STREET, S.W.
C              WASHINGTON, D.C.  20460
C
C              TELEPHONE: 202-755-0603
C                         202-755-0570
C
C
C**************************************************************************
C
C      DESIGNED AND WRITTEN BY LEWIS E. GUTHMAN
C
C      JANUARY, 1978
C
C**************************************************************************
C
C
C**MAIN: MAIN ROUTINE FOR CALCULATING MOBILE SOURCE EMISSION FACTORS
C
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IBCFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFCNR
      COMMON/REGCOM/IREJN
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,MS
      COMMON/ALTCOM/INTALT(5,100),B4ALT(2,100),MODFLG(100),NEWFAC
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKCD(4,20),CY,SP3FLG,UNFFLG,
     *    PRTFLG
      REAL EFRETM(3,6),WTEDEF(3),LNKDTA(7),SPD(3),MS(6),COMCCC(6)
      REAL IDLRTM(3,6),IDLWTD(3)
C
      EQUIVALENCE (SPD(1),LNKDTA(1))
C
      DATA IRJCLD/0/
      DATA INITFL/1/
```

```
C
C***********************************************************************
C
      CALL INPUT(INITFL,CY,ICYPR)
C
C***********************************************************************
C
100   CONTINUE
C
      INITFL=0
C
      CALL INPUT(INITFL,CY,ICYPR)
C
      IF(IRDFLG.EQ.0) GO TO 99
C
      IF(IREJN.NE.IRJOLD) CALL INITEX
      IF(IREJN.NE.IRJOLD.AND.IMFLG.EQ.1) CALL LDVIEX
C
      IRJOLD = IREJN
C
      CALL EFCALX(CY,LNKDTA,MS,EPRETM,WTEDEP,COMCCC,IDLETM,IDLWTD)
C
      CALL OUTPUT(ICYPR,EPRETM,WTEDEP,COMCCC,IDLETM,IDLWTD)
C
      GO TO 100
C
C***********************************************************************
C
99    CONTINUE
C
C     DEBUG SUBCHK
      STOP
      END
```

A.2 INPUT

```
      SUBROUTINE INPUT(INITFL,CY,ICYPR)
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,INFLG,ICEVFG,PRTFLG,IFORM
      COMMON/REGCOM/IREJN
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,VMTMIX
      COMMON/ALTCOM/INTALT(5,100),R4ALT(2,100),MODFLG(100),NEWFAC
      COMMON/MYMCOM/MYM,MYR,TF
      COMMON/JUNK1/AC,XLOAD,TRAILR,ABSHUM
      COMMON/JUNK2/HGWGT,HDWGT,HGCID,HDCID
      COMMON/PROJCM/PROJID
      COMMON/INCOM/ICYIN,ISTRIN,INTFLG,MODYR1,MODYR2
      COMMON/SP1CCM/SP1,SPAV
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKCD(4,20),CY,VMFLAG,SP3FLG,
     *        NMHFLG,IDLFLG,UNFFLG,PRTFLG
      REAL XLOAD(3),SPD(3),VMTMIX(6),MYM(20,6),MYR(20,6),TF(20,6)
      REAL LNKDTA(7),PROJID(20)
      EQUIVALENCE (SPD(1),LNKDTA(1))
C     DATA VMTMIX/.803,.058,.058,.045,.031,.005/
      DATA IREAD,IWRI/5,6/
C
C***********************************************************************
C**SKIP THIS STUFF EXCEPT DURING FIRST SUBR. CALL
      IF(INITFL.EQ.0) GO TO 500
C**READ IN PROJID,FLAGS, AND MYM-MYR
C
      READ(IREAD,701) IPROMT
C
      IF(IPROMT.EQ.1) WRITE(IWRI,752)
752   FORMAT('0ENTER PROJECT ID:')
      READ(IREAD,700) PROJID
700   FORMAT(20A4)
      IF(IPROMT.EQ.1) WRITE(IWRI,763)
      READ(IREAD,701) INFLAG
      IF(IPROMT.EQ.1) WRITE(IWRI,757)
      READ(IREAD,701) SP3FLG
      IF(IPROMT.EQ.1) WRITE(IWRI,753)
      READ(IREAD,701) VMFLAG
      IF(IPROMT.EQ.1) WRITE(IWRI,761)
      READ(IREAD,701) MYMRFG
      IF(IPROMT.EQ.1) WRITE(IWRI,754)
      READ(IREAD,701) ALTFLG
      IF(IPROMT.EQ.1) WRITE(IWRI,762)
      READ(IREAD,701) INFLG
      IF(IPROMT.EQ.1) WRITE(IWRI,755)
      READ(IREAD,701) ALHFLG
      IF(IPROMT.EQ.1) WRITE(IWRI,756)
      READ(IREAD,701) TRKFLG
      IF(IPROMT.EQ.1) WRITE(IWRI,766)
      READ(IREAD,701) IFORM
      IF(IPROMT.EQ.1) WRITE(IWRI,765)
      READ(IREAD,701) PBTFLG
      IF(IPROMT.EQ.1) WRITE(IWRI,764)
      READ(IREAD,701) ICEVPG
      IF(IPROMT.EQ.1) WRITE(IWRI,759)
      READ(IREAD,701) IDLFLG
      IF(IPROMT.EQ.1) WRITE(IWRI,758)
      READ(IREAD,701) NMHFLG
      IF(IPROMT.EQ.1) WRITE(IWRI,760)
      READ(IREAD,701) UNPFLG
C
701   FORMAT(I1)
753   FORMAT(' ENTER VMFLAG:')
754   FORMAT(' ENTER ALTFLG:')
755   FORMAT(' ENTER ALHFLG:')
756   FORMAT(' ENTER TSKFLG:')
757   FORMAT(' ENTER SP3FLG:')
758   FORMAT(' ENTER NMHFLG:')
759   FORMAT(' ENTER IDLFLG:')
760   FORMAT(' ENTER UNPFLG:')
761   FORMAT(' ENTER MYMRFG:')
762   FORMAT(' ENTER IMFLG:')
763   FORMAT(' ENTER INFLAG:')
764   FORMAT(' ENTER ICEVPG:')
765   FORMAT(' ENTER PBTFLG:')
766   FORMAT(' ENTER IFORM:')
C
C
      IF(VMFLAG.EQ.2.AND.IPROMT.EQ.1) WRITE(IWRI,769)
      IF(VMFLAG.EQ.2.AND.INFLAG.EQ.0) READ(IREAD,*) VMTMIX
      IF(VMFLAG.EQ.2.AND.INFLAG.EQ.1) READ(IREAD,726) VMTMIX
C
      IF(MYMRFG.EQ.1.OR.MYMRFG.EQ.3) READ(IREAD,710) MYR
      IF(MYMRFG.EQ.2.OR.MYMRFG.EQ.3) READ(IREAD,710) MYR
710   FORMAT(10F5.3)
C
C**HERE READ IN E.F. MODIFICATION DATA
      IF(ALTFLG.NE.1) GO TO 810
      IF(IPROMT.EQ.1) WRITE(IWRI,790)
790   FORMAT('0ENTER NO. OF NEW E.F. INTERCEPT/SLOPE PAIRS (I2)')
      IF(INFLAG.EQ.0) READ(IREAD,*) NEWFAC
      IF(INFLAG.EQ.1) READ(IREAD,791) NEWFAC
791   FORMAT(I2)
C
      DO 800 IFAC = 1,NEWFAC
C
      IF(IPROMT.EQ.1) WRITE(IWRI,792)
792   FORMAT(' ENTER REGION,VEH. TYPE,POLLUTANT,FIRST MY,',
     * /' LAST MY,NEW INTERCEPT (A), AND NEW SLOPE (B)')
      IF(INFLAG.EQ.0) READ(IREAD,*) IRGALT,IMDALT,IPLALT,
     *  MYFRST,MYLAST,BASNEW,DELNEW
      IF(INFLAG.EQ.1) READ(IREAD,793) IRGALT,IMDALT,IPLALT,
     *  MYFRST,MYLAST,BASNEW,DELNEW
793   FORMAT(I1,1X,I1,1X,I1,1X,I2,1X,I2,1X,F6.2,1X,F6.2)
C
```

```
         INTALT(1,IFAC) = IRGALT
         INTALT(2,IFAC) = IMDALT
         INTALT(3,IFAC) = IPLALT
         INTALT(4,IFAC) = MYFRST
         INTALT(5,IFAC) = MYLAST
         R4ALT(1,IFAC) = BASNEW
         R4ALT(2,IFAC) = DELNEW
C
800   CONTINUE
C
810   CONTINUE
C
C**HERE READ IN INSP./MAINT. PARAMS
      IF(IMFLG.EQ.0) GO TO 900
      IF(IPROMT.EQ.1) WRITE(IWRI,772)
772   FORMAT('0ENTER YEAR I/M BEGINS, STRINGENCY, M.T. FLAG,',
     *  /,' FIRST MODEL YEAR AND LAST MODEL YEAR OF PROG. BENEFITS')
      IF(INFLAG.EQ.0)
     *READ(IREAD,*) ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2
      IF(INFLAG.EQ.1)
     *READ(IREAD,729) ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2
900   CONTINUE
C
729   FORMAT(I2,1X,I2,1X,I1,1X,I2,1X,I2)
C
      CALL TFCALX
C
      RETURN
C
C***********************************************************************
C
C**READ E.P. CALCULATION INPUT PARAMETERS
C
500   CONTINUE
C
      IRDFLG = 1
C
      IF(IPROMT.EQ.1.AND.SP3FLG.EQ.0) WRITE(IWRI,767)
767   FORMAT('0ENTER REGION, CY,SPD(1),TEMP,PCCO,PCHS,PCCC: ')
      IF(IPROMT.EQ.1.AND.SP3FLG.EQ.1) WRITE(IWRI,768)
768   FORMAT('0ENTER REGION, CY,SPD(3),TEMP,PCCO,PCHS,PCCC: ')
C
      IF(SP3FLG.EQ.0.AND.INFLAG.EQ.0)
     *READ(IREAD,*,END=99) IREJN,CY,SP1,TEMP,PCCO,PCHS,PCCC
      IF(SP3FLG.EQ.1.AND.INFLAG.EQ.0)
     *READ(IREAD,*,END=99) IREJN,CY,SPD,TEMP,PCCO,PCHS,PCCC
      IF(SP3FLG.EQ.0.AND.INFLAG.EQ.1)
     *READ(IREAD,725,END=99) IREJN,CY,SP1,TEMP,PCCO,PCHS,PCCC
      IF(SP3FLG.EQ.1.AND.INFLAG.EQ.1)
     *READ(IREAD,725,END=99) IREJN,CY,SPD,TEMP,PCCO,PCHS,PCCC
C
725   FORMAT(I1,1X,I2,7(1X,F4.1))
C
C**CHECK CALENDAR YEAR
```

```
      IF(CY.GE.70) GO TO 505
      WRITE(IWRI,785)
 785  FORMAT(' ***ERROR: CALENDAR YEAR RANGE IS 70 THRU 99')
      STOP
 505  CONTINUE
      ICYPR = CY
      IF(CY.GT.95) CY = 95
C
C**CHECK AMBIENT TEMPERATURE
      IF(TEMP.GE.0.0.AND.TEMP.LE.110.) GO TO 697
      WRITE(IWRI,787)
 787  FORMAT(' ***ERROR: VALID TEMPERATURE RANGE IS 0-110 DEG. (F)')
      STOP
 697  CONTINUE
C
C**CHECK INPUT SPEED(S)
      IF(SP3FLG.EQ.1) GO TO 650
      IF(SP1.GT.0.) GO TO 620
      WRITE(IWRI,786)
 786  FORMAT(' ***ERROR: SPEED MUST BE POSITIVE')
      STOP
 620  IF(SP1.GT.60.) SP1 = 60.
      IF(SP1.LT.5.) WRITE(IWRI,788)
 788  FORMAT(' **WARNING: AVG. ROUTE SPEED LESS THAN 5 M.P.H.')
      GO TO 695
C
 650  CONTINUE
      IF(SPD(1).GT.0.0.AND.SPD(2).GT.0.0.AND.SPD(3).GT.0.) GO TO 670
      WRITE(IWRI,786)
      STOP
 670  CONTINUE
      DO 671 I=1,3
      IF(SPD(I).LT.5.) WRITE(IWRI,788)
 671  IF(SPD(I).GT.60.) SPD(I) = 60.
C
 695  CONTINUE
C
C**END SPEED CHECK
C
      IF(SP3FLG.EQ.1) GO TO 520
C**HERE TO DECOMPOSE SINGLE ENTERED SPEED INTO BAG SPEEDS
C     SPD(1) = SP1*1.30
C     SPD(2) = SP1*.825
C     SPD(3) = SP1*1.30
      SPD(1) = SP1
      SPD(2) = SP1
      SPD(3) = SP1
C     SPD(1) = SP1*(1.3777386 - (PCCC*.30/79.42))
C     SPD(2) = SP1*(.75935 + (PCHS*.175/72.72))
C     SPD(3) = SPD(1)
C
C     PCHSNC = PCCC - PCCO + PCHS
C     PCHSTB = 100. - PCCC - PCHS
C     SPD(1) = SP1*(1.41114406 - .0041114406*PCCO)
```

```
C     SPD(2) = SP1*(.6162276026 + .003837724*PCHSTE)
C     SPD(3) = SP1*(1.44902449 - .0044902449*PCHSNC)
520   CONTINUE
C
      IF(VMFLAG.EQ.1.AND.IPROMT.EQ.1) WRITE(IWRI,769)
769   FORMAT('OENTER VMT SPLIT:')
C
      IF(VMFLAG.EQ.1.AND.INFLAG.EQ.0) READ(IREAD,*) VMTMIX
      IF(VMFLAG.EQ.1.AND.INFLAG.EQ.1) READ(IREAD,726) VMTMIX
C
726   FORMAT(6F4.3)
C
C**HERE READ IN ALCH PARAMS
      IF(ALHFLG.EQ.0) GO TO 890
      IF(IPROMT.EQ.1) WRITE(IWRI,770)
770   FORMAT('OENTER AC,XLOAD(3),TRAILR,ABSHUM')
      IF(INFLAG.EQ.0)
     *READ(IREAD,*) AC,XLOAD,TRAILR,ABSHUM
      IF(INFLAG.EQ.1)
     *READ(IREAD,727) AC,XLOAD,TRAILR,ABSHUM
890   CONTINUE
C
727   FORMAT(6F4.3)
C
C**HERE READ IN TRUCK CHAR. PARAMS
      IF(TRKFLG.EQ.0) GO TO 895
      IF(IPROMT.EQ.1) WRITE(IWRI,771)
771   FORMAT('OENTER HGWGT,HDWGT,HGCID,HDCID')
      IF(INFLAG.EQ.0)
     *READ(IREAD,*) HGWGT,HDWGT,HGCID,HDCID
      IF(INFLAG.EQ.1)
     *READ(IREAD,728) HGWGT,HDWGT,HGCID,HDCID
895   CONTINUE
C
728   FORMAT(4F5.0)
C
      RETURN
C
C***********************************************************************
C
99    CONTINUE
      IRDFLG = 0
C     DEBUG SUBCHK
      RETURN
      END
```

A.3 OUTPUT

```
      SUBROUTINE OUTPUT(CY,EFRETM,WTEDEF,COMCCC,IDLBTM,IDLWTD)
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRCFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFCHE
      COMMON/REGCOM/IREJN
      COMMON/REFCOM/REF
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,VMTMIX
      COMMON/ALTCOM/INTALT(5,100),R4ALT(2,100),MODFLG(100),NEWFAC
      COMMON/MYMCOM/MYM,MYR,TF
      COMMON/JUNK1/AC,XLOAD,TRAILR,ABSHUM
      COMMON/JUNK2/HGWGT,HDWGT,HGCID,HDCID
      COMMON/RET1/ALHRET
      COMMON/RET2/TRKRET(20,3,2)
      COMMON/PROJCM/PROJID
      COMMON/IMCOM/ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2
      COMMON/SP1COM/SP1,SPAV
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKCD(4,20),CY,SP3FLG,
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG
      REAL VMTMIX(6),MYM(20,6),MYR(20,6),PNAM1(3),PNAM2(3),PNAM3(3)
      REAL SPD(3),XLOAD(3)
      REAL EVPNAM(3),EXHHDR(9),IDLNM1(3),IDLNM2(3),IDLNM3(3)
      REAL IDLBTM(3,6),IDLWTD(3),PNAMH(2)
      REAL IDLHDR(8),IDLHD2(4),REGN1(3),REGN2(3)
      REAL ALHRET(20,4,3)
      REAL A(20,3,3),U(20,3,3),L(3,3),H(3),XLOAD(3)
      REAL EFRETM(3,6),WTEDEF(3),LNKDTA(7),PROJID(20)
      REAL COMCCC(6),TF(20,6)
      REAL REF(20,26,3,6)
      REAL YESNO(2)
      EQUIVALENCE (SPD(1),LNKDTA(1))
C
      DATA PNAMH/'NON-','METH'/
      DATA PNAM1/'   T','EXHA','EXHA'/
      DATA PNAM2/'CTAL','UST ','UST '/
      DATA PNAM3/' HC ',' CO ','NOx '/
      DATA IDLNM1/'   I','   I','   I'/
      DATA IDLNM2/'DLE ','DLE ','DLE '/
      DATA IDLNM3/' HC ',' CO ','NOx '/
      DATA EVPNAM/'   *','EVAP',' HC '/,EVENMB/'E'/
      DATA IWRI,IWRUNF/6,9/
      DATA EXHHDR/'COMP','OSIT','E EM','ISSI','ON F','ACTO',
     *    'RS (','GM/M','ILE)'/
      DATA IDLHDR/'IDLE',' EMI','SSIO','N FA','CTOR','S (G',
     *   'M/MI','N)  '/
      DATA IDLHD2/' HOT',' STA','BILI','ZED '/
      DATA REGN1/'49-S','CALI','HI-A'/
      DATA REGN2/'TATE','F.  ','LT. '/
      DATA DASH/'----'/
      DATA INITFL/1/
      DATA YESNO/'NO  ','YES '/
C
```

```
C*******************************************************************************
      IF(NMHFLG.EQ.0) GO TO 77
      PNAM1(1) = PNAMH(1)
      PNAM2(1) = PNAMH(2)
77    CONTINUE
C
      IF(INITFL.NE.1) GO TO 175
C**HERE FIRST TIME
      INITFL=0
      IF(IFORM.EQ.0) WRITE(IWRI,7011) PROJID
      IF(IFORM.EQ.0) WRITE(IWRI,7012)
      IF(IFORM.EQ.0) WRITE(IWRI,7013)
      IF(IFORM.EQ.0) WRITE(IWRI,7014)
C
      IF(IFORM.EQ.1) WRITE(IWRI,701) PROJID
C
C**WRITE E.F. MODIFICATION PROFILE
      IF(ALTFLG.EQ.0) GO TO 100
      IF(IFORM.EQ.0) GO TO 100
C
      WRITE(IWRI,765)
      WRITE(IWRI,766)
      DO 111 IFAC = 1,NEWFAC
      IF(MODFLG(IFAC).EQ.0) WRITE(IWRI,767) (INTALT(J,IFAC),J=1,5),
     *  (R4ALT(K,IFAC),K=1,2)
      IF(MODFLG(IFAC).EQ.1) WRITE(IWRI,768) (INTALT(J,IFAC),J=1,5),
     *  (R4ALT(K,IFAC),K=1,2)
111   CONTINUE
100   CONTINUE
765   FORMAT('0','   EMISSION FACTOR MODIFICATION PROFILE:')
766   FORMAT(' REGION  MODE  POLLUTANT  FIRST MY  LAST MY    BASE     ',
     *  'DEL  ALTERED',
     *      /,'+______ ____ _________ ________ _______   ____
     *  '___  _______')
767   FORMAT(1X,2X,I1,7X,I1,8X,I1,7X,'19',I2,5X,'19',I2,4X,F6.2,2X,F6.2,
     *  4X,'NO')
768   FORMAT(1X,2X,I1,7X,I1,8X,I1,7X,'19',I2,5X,'19',I2,4X,F6.2,2X,F6.2,
     *  4X,'YES')
C**END E.F. MODIFICATION PROFILE
C
      IF(IFORM.EQ.1) WRITE(IWRI,7017) PNAM1(1),PNAM2(1),PNAM3(1)
C
7013  FORMAT(1X,'G CY   BAG SPEEDS   TMP   COLD/HOT START  I   L',
     *  'DV    LDT1   LDT2   HDG    HDD    MC ',
     *  '   LDV   LDT1  LDT2  HDG   HDD   MC ',
     *  ' ALL VEH')
7012  FORMAT('0R                                               P'/,
     *       ' E                         AMB.                  O',
     *  '          COMPOSITE EMISSION FACTORS                    ',
     *  'VEHICLE MIX                  C.E.F.')
C
7014  FORMAT(' - -- ---------------- ---  ----------------',
     *  ' - -----------------------------------------',
     *  ' ---------------------------------',
     *  ' ----- ')
C
7017  FORMAT('0',2X,'*',2A4,A3,' EMISSION FACTORS INCLUDE ',
     *  'EVAP. HC EMISSION FACTORS')
C
      IF(IFORM.EQ.1) WRITE(IWRI,710)
175   CONTINUE
C
      IF(IFORM.EQ.0) GO TO 888
C*********************************************************************
C
      WRITE(IWRI,7029)
      IF(SP3FLG.EQ.1)
     *WRITE(IWRI,703) CY,TEMP,VMTMIX,REGN1(IREJN),REGN2(IREJN),SPD,SPAV,
     *  PCCO,PCHS,PCCC
      IF(SP3FLG.EQ.0)
     *WRITE(IWRI,7035) CY,TEMP,VMTMIX,REGN1(IREJN),REGN2(IREJN),SP1,SPD,
     *  SPAV,PCCO,PCHS,PCCC
      IF(ALHFLG.EQ.1) WRITE(IWRI,704) AC,XLOAD,TRAILR,ABSHUM
      IF(TRKFLG.EQ.1) WRITE(IWRI,705) HGWGT,HDWGT,HGCID,HDCID
      IF(IMFLG.EQ.1) WRITE(IWRI,7051) ICYIM,ISTRIN,YESNO(IATFLG+1)
      IF(IMFLG.EQ.1) WRITE(IWRI,7052) MODYR1,MODYR2
C
      WRITE(IWRI,7059) EXHHDR
      WRITE(IWRI,706)
C
      IF(PRTFLG.EQ.0.OR.PRTFLG.EQ.1)
     *WRITE(IWRI,707) PNAM1(1),PNAM2(1),PNAM3(1),(EFRETM(1,IM),IM=1,6),
     *  WTEDEF(1)
      IF(ICEVFG.EQ.1) WRITE(IWRI,708) EVPNAM,COMCCC,DASH
      IF(PRTFLG.EQ.0.OR.PRTFLG.EQ.2)
     *WRITE(IWRI,707) PNAM1(2),PNAM2(2),PNAM3(2),(EFRETM(2,IM),IM=1,6),
     *  WTEDEF(2)
      IF(PRTFLG.EQ.0.OR.PRTFLG.EQ.3)
     *WRITE(IWRI,707) PNAM1(3),PNAM2(3),PNAM3(3),(EFRETM(3,IM),IM=1,6),
     *  WTEDEF(3)
C
      IF(IDLFLG.EQ.0) GO TO 200
      WRITE(IWRI,709) IDLHD2,IDLHDR
      WRITE(IWRI,707) (IDLNM1(IQ),IDLNM2(IQ),IDLNM3(IQ),(IDLRTM(IQ,IM),
     *  IM=1,6),IDLWTD(IQ),IQ=1,3)
200   CONTINUE
C
      WRITE(IWRI,710)
C
      GO TO 899
C
C*********************************************************************
C
888   CONTINUE
          IPP1=PRTFLG
          IPP2=PRTFLG
          IF(PRTFLG.EQ.0) IPP1=1
          IF(PRTFLG.EQ.0) IPP2=3
      IF(ICEVFG.EQ.1) WRITE(IWRI,7088) IREJN,CY,SPD,TEMP,PCCO,PCHS,
     *      PCCC,EVENMB,COMCCC,VMTMIX
7088  FORMAT(1X,I1,1X,I2,1X,F4.1,'/',F4.1,'/',F4.1,1X,
     *  F3.0,1X,F5.1,1X,F5.1,1X,F5.1,1X,A1,6F7.2,6F6.3)
      DO 1203 IPNX=IPP1,IPP2
      WRITE(IWRI,79080) IREJN,CY,SPD,TEMP,PCCO,PCHS,PCCC,IPNX,
     *  (EFRETM(IPNX,IM),IM=1,6),VMTMIX,WTEDEP(IPNX)
1203  CONTINUE
79080 FORMAT(1X,I1,1X,I2,1X,F4.1,'/',F4.1,'/',F4.1,1X,
     *  F3.0,1X,F5.1,1X,F5.1,1X,F5.1,1X,I1,6F7.2,6F6.3,F7.2)
C
899   CONTINUE
C
C
C*************************************************************************
C
      IF(UNFFLG.EQ.1) WRITE(IWRUNF) EFRETM,WTEDEP
C
C*************************************************************************
701   FORMAT('1',20A4/)
7011  FORMAT('1',20A4)
C
7029  FORMAT(32X,'VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC')
C
703   FORMAT('  CAL. YEAR: 19',I2,5X,'TEMP: ',F4.1,
     *  '(F)',8X,5(F5.3,'/'),F5.3,
     *  /1X,' REGION: ',2A4,4X,F4.1,'/',F4.1,'/',F4.1,
     *  ' MPH ','(',F4.1,')',7X,' ',F5.1,'/',F5.1,'/',F5.1 )
C
7035  FORMAT('  CAL. YEAR: 19',I2,5X,'TEMP: ',F4.1,
     *  '(F)',8X,5(F5.3,'/'),F5.3,
     *  /1X,' REGION: ',2A4,4X,F4.1,':',F4.1,'/',F4.1,'/',F4.1,
     *  ' MPH ','(',F4.1,')',3X,' ',F5.1,'/',F5.1,'/',F5.1 )
704   FORMAT('   AC:',F6.2,2X,'XLOAD:',3F7.2,2X,'TRAILR:',
     *  F7.2,2X,'ABSHUM:',F7.2)
C
705   FORMAT('   HGWGT:',F7.0,2X,'HDWGT:',F7.0,2X,'HGCID:',
     *  F7.2,2X,'HDCID:',F7.2)
C
7051  FORMAT('   LDV I/M PROGRAM STARTING IN 19',I2,
     *  ', STRINGENCY LEVEL ',I2,'%, MECH. TRAINING: ',A4)
C
7052  FORMAT('   I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 19',
     *  I2,' THROUGH 19',I2)
7059  FORMAT('0',22X,9A4)
C
706   FORMAT(' ',15X,'LDV       LDT1      LDT2      HDG       HDD   ',
     *  '    MC     ALL MODES')
C
707   FORMAT((1X,2A4,A3,':',6(F7.2,2X),1X,F8.2))
C
708   FORMAT(1X,2A4,A3,':',6(F7.2,2X),5X,A4)
C
709   FORMAT('0',16X,4A4,8A4)
```

```
C
710   FORMAT(' -----------------------------------------',
     *'-----------------------------------------')
C
C
C     DEBUG SUBCHK
      RETURN
      END
```

Appendix A: MOBILE1 Program Listing

A.4 EFCALX

```
      SUBROUTINE EFCALX(CY,LNKDTA,MS,EFRETM,WTEDEF,CCRETM,IDLRTM,IDLWTD)
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFIG,ICEVFG,FRTFLG,IFCRE
      COMMON/CEVCOM/CCEV
      COMMON/REGCOM/IREJN
      COMMON/BEFCOM/BEF
      COMMON/IDLCOM/IDLBEF
      COMMON/MYMCOM/MYM,MYR,TF
C
      INTEGER MYP , P ,  CYP
      INTEGER ALHFIG,TRKFLG,ALTFLG,CY,SP3FLG,
     *        NMHFIG,IDLFLG,UNFFLG,MYMRFG,FRTFLG
C
      REAL IDLBEF(20,26,3,6),IDLFAC(20,3,6),IDLCMP(3,6),IDLWTD(3)
      REAL IDLRTM(3,6)
      REAL COMPCC(20,6),CCRETM(6)
      REAL CFRET(20,3,6)
      REAL        BEF(20,26,3,6),       CCEV(45,6),
     *            EFRETM(3,6),          COMEEF(20,3,6),
     *            COMEMY(3,6),          LNKDTA(7),
     *            MYM(20,6),            MYR(20,6),
     *            MS(6),                PCCO,
     *            PCCC,                 PCHS,
     *            SPD(3),               TEMP,
     *            TF(20,6),             WTEDEF(3)
C
C
C***********************************************************************
C
       SPD(1)   = LNKDTA(1)
       SPD(2)   = LNKDTA(2)
       SPD(3)   = LNKDTA(3)
       TEMP     = LNKDTA(4)
       PCCO     = LNKDTA(5)
       PCHS     = LNKDTA(6)
       PCCC     = LNKDTA(7)
C
C
             CALL BIGCPX(CY,TEMP,PCCO,PCHS,PCCC,SPD,CFRET)
C
C
       CYP = CY   69
C
C
       DO 500 P = 1,3
              WTEDEF(P) = 0.0
              IDLWTD(P) = 0.0
          DO 400 M = 1,6
              COMEMY(P,M) = 0.0
              IDLCMP(P,M) = 0.0
       IF(P.EQ.1) CCRETM(M) =0.
```

```
              DO 300 I = 1,20
C
      MYP = CYP- (20-I) - 50
C
                IF (P.EQ.1)  GO TO 333
                GO TO 444
C
333   COMPEF(I,P,M)=(BEF(I,CYP,P,M)*CFBET(I,P,M)+ CCEV(MYP,M))*TF(I,M)
      COMPCC(I,M)   =CCEV(MYP,M)*TF(I,M)
      GO TO 555
444   COMPEF(I,P,M)=(BEF(I,CYP,P,M)*CFBET(I,P,M)                )*TF(I,M)
C
555   CONTINUE
C
      IDLFAC(I,P,M)=(IDLBEF(I,CYP,P,M)                         )*TF(I,M)
C
      COMPMY(P,M)  = COMPMY(P,M)  + COMPEF(I,P,M)
      IDLCMP(P,M)  = IDLCMP(P,M)  + IDLFAC(I,P,M)
      IF(P.EQ.1) CCRETM(M)  = CCRETM(M)  + COMPCC(I,M)
C
300          CONTINUE
      WTEDEF(P)  = WTEDEF(P)  + COMPMY(P,M)*MS(M)
      IDLWTD(P)  = IDLWTD(P)  + IDLCMP(P,M)*MS(M)
400      CONTINUE
C
500   CONTINUE
C
      DO 600 M = 1,6
      DO 600 P = 1,3
        EFRETM(P,M)  = COMPMY(P,M)
        IDLRTM(P,M)  = IDLCMP(P,M)
600   CONTINUE
C
C
      RETURN
C
      END
```

A.5 BIGCFX

```
      SUBROUTINE BIGCFX(CY,T,PCCO,PCHS,PCCC,SPD,CFRET)
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFCBE
      COMMON/ALTCOM/INIALT(5,100),B4ALT(2,100),MODFLG(100),NEWFAC
      COMMON/SEGCOM/IREJN
      COMMON/JUNK1/AC,XLOAD,TRAILR,ABSECM
      COMMON/JUNK2/HGWGT,HDWGT,HGCID,HDCID
      COMMON/RET1/ALHRET(20,4,3)
      COMMON/RET2/TRKRET(20,3,2)
      COMMON/SP1COM/SP1,SPAV
      COMMON/MYMCOM/MYM,MYR,TF
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKCD(4,20),CX,SP3FLG,
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG
      INTEGER INITFL,IEQNAR(45,3,3,4),HDINDX(45,3)
      INTEGER CY,G(45,3,4)
C IN G, 1ST INDEX IS MY, 2ND IS REGION, AND 3RD IS MODE
C IN IEQNAR, 2ND INDEX IS POLLUTANT, 3RD IS REGION, 4TH IS MODE
C IN HDINDX, 2ND INDEX IS REGION (NOT FUNCTION OF POL. OR MODE)
C
C     REAL A(20,3,3),U(20,3,3),
C    *  L(3,3),B(3)
      REAL XLOAD(3)
      REAL T,SPD(3),SPE(3),CFRET(20,3,6)
      REAL D1(4,3),D2(4,3)
      REAL MIDDLE,LEFT
      REAL SPBACK(18,3,3),SPBOT(18,3,3)
      REAL ATR(4,3,2),BTR(4,3,2),CTR(4,3,2)
      REAL C(4,8,3)
      REAL CUMMIL(20,6),MYM(20,6),MYR(20,6),TF(20,6)
      INTEGER MAXAGE(4)
C
      DATA MAXAGE/19,19,19,19/
      DATA INITFL/1/
C
C***********************************************************************
C
C**COEFFICIENTS IN SPEED/TEMP/COLD START FACTOR: EQN,INDEX,POL.
      DATA C/
     *   2.931000, 2.931000, 2.433900, 1.993400,
     *  -0.014779,-0.014779,-0.023591,-0.022269,
     *   0.673, 2.410, 0.623,-0.032, 0.569, 0.863, 0.301, 0.445,
     *   4.750, 2.430, 1.110, 0.497, 0.393, 0.555, 0.284, 0.357,
     *   5.690, 2.610, 1.050, 0.243, 0.471, 0.597, 0.270, 0.175,
     *   5.654800, 5.654800, 5.546000, 4.239100,
     *  -0.015965,-0.015965,-0.028945,-0.017522,
     *  -14.74, 33.89, 11.29,  0.20,  9.62,  9.77,
     *    4.24,  6.99, 42.84, 25.26, 15.85,  4.12,
     *    5.76,  4.71,  2.34,  2.20, 57.57, 35.90,
     *   21.17,  3.96,  7.74,  6.70,  3.13,  2.12,
     *  -0.10E+03,-0.10E+03,-0.10E+03,-0.10E+03,
     *   0.0  , 0.0  , 0.0  , 0.0  , 1.140, 1.160,
     *   3.260, 3.050, 0.0  , 0.0  , 0.335, 0.318,
     *   1.250, 1.260, 2.990, 2.880, 0.0  , 0.0  ,
     *   0.184, 0.180, 0.810, 0.800, 1.890, 2.010,
     *   0.0  , 0.0  , 0.116, 0.126  /
C
C**COEFFICIENTS IN DENOMINATOR OF SPEED/TEMP/COLD START FACTOR
      DATA D1/5.67,2.8,1.38,.54,56.43,36.4,23.7,6.98,1.,1.,2.47,2.46/
      DATA D2/.47,.64,.28,.28,7.59,6.79,3.14,3.14,0.,0.,.18,.18/
C
C**SPEED CORRECTION FACTOR INDEX: CAL. YR., REGION, MODE
      DATA G/15*2, 2, 2, 4, 5, 6, 7,14,17,17,18,18,18,18*18,
     *         15*2, 3, 3, 4, 5, 6, 7,13,16,16,18,18,18,18*18,
     *         15*1, 1, 1, 8, 9,10,11,12,15,15,18,18,18,18*18,
     *
     *         15*2, 2, 2, 4, 5, 6, 7,14,17,17,18,18,18,18*18,
     *         15*2, 2, 2, 4, 5, 6, 7,13,16,16,18,18,18,18*18,
     *         15*1, 1, 1, 8, 9,10,11,12,15,15,18,18,18,18*18,
     *
     *         28*14,17*18,
     *         27*13,18*18,
     *         28*12,17*18,
     *
     *         15*2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,18*17,
     *         15*2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,18*16,
     *         15*1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,18*15 /
C
      DATA IEQNAB/17*1,7*2,5*3,16*4,    17*1,7*2,5*3,16*4,
     *            17*1,7*2,2*3,19*4,    15*1,9*2,     21*4,
     *            15*1,9*2,     21*4,   15*1,9*2,     21*4,
     *            17*1,7*2,5*3,16*4,    17*1,7*2,5*3,16*4,
     *            17*1,7*2,2*3,19*4,
     *            17*1,7*2,21*3,        17*1,7*2,21*3,
     *            17*1,7*2,21*3,        17*1,7*2,     21*4,
     *            17*1,7*2,     21*4,   17*1,7*2,     21*4,
     *            17*1,7*2,21*3,        17*1,7*2,21*3,
     *            17*1,7*2,21*3,
     *            28*2,17*3,            28*2,17*3,
     *            28*2,17*3,            27*2,18*4,
     *            27*2,18*4,            27*2,18*4,
     *            28*2,17*3,            28*2,17*3,
     *            28*2,17*3,
     *            27*1,18*2,27*1,18*2,27*1,18*2,
     *            27*1,18*2,27*1,18*2,27*1,18*2,
     *            27*1,18*2,27*1,18*2,27*1,18*2  /
C
      DATA HDINDX/19*1,4*2,5*3,17*4,
     *            19*1,4*2,1*3,21*4,
     *            19*1,4*2,5*3,17*4    /
C
C
C**********************************************************************
C
      IF(INITFL.NE.1) GO TO 177
```

```
C  HERE 1ST TIME
      INITFL = 0
      SPB(1) = 26.0
      SPB(2) = 16.0
      SPB(3) = 26.0
      CALL SPFCLX(SPB,SPBOT)
C
C
      CALL GETCUM(CUMMIL)
C
C
C***************************************************************************
C
177   CONTINUE
C
      CALL SPFCLX(SPD,SPBACK)
C
C
      IF(ALHFLG.EQ.1) CALL ALUH(CY,AC,XLOAD,TRAILR,PCCO,PCCC,ABSHUM)
C
C***************************************************************************
C
      FCO = PCCO*.01
      FHC = PCHS*.01
      FCC = PCCC*.01
C
C**FRACTION COLD OF(NON-CAT): FCO
C**FRACTION HOT START(CAT):  FHC
C**FRACTION COLD OF(CAT)   :   FCC
C**FRACTION HOT START(NON-CAT): FHC
      FHO = (FCC-FCO) + FHC
C
      DO 500 I = 1,20
C
         MY = CY - (20-I)
         MYC = MY - 50
         IAGE = CY - MY
         AGE = IAGE
C
C************************
      IF(MYC.LE.0) STOP
C>>>>>>>>>>>>>>>>>>>>>>>>
C
      DO 500 IMODE = 1,4
C
      IMOD4 = IMODE
      IF(IMODE.EQ.4) IMOD4 = 6
      IAGEM = IAGE
         MAX = MAXAGE(IMODE)
      IF(IAGEM.GT.MAX) IAGEM = MAX
         IF(IAGEM.EQ.0) VMTAGE = 0.0
         IF(IAGEM.GT.0) VMTAGE = CUMMIL(IAGEM,IMOD4)*.0001

         IGX = G(MYC,IREGN,IMODE)
```

```
C
      DO 500 IP = 1,3
C
C**DEFAULT
C
      IEQN = IEQNAB(NYC,IP,IREJN,IMODE)
C
C****************************************
C
C
      FACL = FCO
      FACM = FMO
      IF(IEQN.LT.2) GO TO 888
      FACL = FCC
      FACM = FMC
888   FACR = (1.0 - FACL   FACM)
C
C**********************************************************************
C
      DENOM = D1(IEQN,IP) + D2(IEQN,IP)*VMTAGE
C
      LEFT = FACL * (EXP(C(IEQN,1,IP)+T*C(IEQN,2,IP)) + C(IEQN,3,IP) +
     *  C(IEQN,4,IP)*VMTAGE) * SPBACK(2,1,IP)/SPBOT(2,1,IP)
C
C
      MIDDLE=FACM* (C(IEQN,5,IP)+C(IEQN,6,IP)*VMTAGE)
     *    *SPBACK(IGX,3,IP)/SPBOT(IGX,3,IP)
C
C
      RIGHT=FACR*(C(IEQN,7,IP)+C(IEQN,8,IP)*VMTAGE)
     *     *SPBACK(IGX,2,IP)/SPBOT(IGX,2,IP)
C
      TOP = LEFT + MIDDLE + RIGHT
C
C
      FACTOR = TOP/DENOM
C
      IF(ALHFLG.EQ.1) FACTOR = FACTOR*ALHRET(I,IMODE,IP)
C
      IMOD2 = IMODE
C
      IF(IMODE.EQ.4) IMOD2 = 6
C
      CFRET(I,IP,IMOD2) = FACTOR
C
500   CONTINUE
C
C**********************************************************************
C
C
C   FOR MODES 4 AND 5
C
C
      DATA ATR/ 2.42, 1.14, 1.56, 1.54,
     *          1.74, 1.54, 1.24, 0.62,
     *          .851, .812, .820, .764,
     *          0.94, 0.94,  .820, 1.20,
     *          1.44, 1.44,  1.20, 1.44,
     *          0.62, 0.62,  0.72, 1.00  /
C
      DATA BTR/  .153, -.065,  -.096, -.071,
     *           .117,  .097,  -.078, -.039,
     *          .0074, .0094,  .0081, .0120,
     *          -.055, -.055,  -.051, -.072,
     *           .092, -.092,  -.072, -.088,
     *          -.043, -.043,  -.054, -.074  /
C
      DATA CTR/ .0016, .0004, .0009, -.0003,
     *          .0015, .0010, .0008, .0004,
     *          .0000, .0000, .0000, .0000,
     *          .0004, .0004,  .0005, .0006,
     *          .0010, .0010,  .0006, .0008,
     *          .0006, .0006,  .0009, .0012  /
C
      IF(TRKFLG.EQ.1) CALL TRKOPC(CY,HGWGT,HDWGT,HGCID,HDCID)
C
C     IF(SP3FLG.EQ.0)  SPAV = SPD(1)/(1.3777386 -  (PCCC*.30/79.42))
      IF(SP3FLG.EQ.0)  SPAV = SP1
C     IF(SP3FLG.EQ.1)  SPAV = SPD(1)/(1.41114406    (PCCC*.0041114406))
      IF(SP3FLG.EQ.1)  SPAV = SPD(2)
C     IF(SP3FLG.EQ.1)  SPAV = AMIN1(SPD(1),SPD(2))
C***ELIMINATE TWO LINES ABOVE
C
C
      DO 700 IMODE = 4,5
      IM = IMODE-3
         DO 700 IP = 1,3
C
      IMY1 = CY-19
                DO 700 IMY = IMY1,CY
      IMYP = IMY - 50
      IF(IMYP.LT.1) IMYP=1
C
                IX = 20-(CY-IMY)
C
            INDX = HDINDX(IMYP,IREJN)
C
       IF(IP.EQ.3.AND.IMODE.EQ.4) GO TO 720
C
       CFRET(IX,IP,IMODE) = EXP(ATR(INDX,IP,IM) +
     *   BTR(INDX,IP,IM)*SPAV + CTR(INDX,IP,IM)*SPAV*SPAV)
C
       GO TO 688
720    CONTINUE
C
       CFRET(IX,IP,IMODE) = ATR(INDX,IP,IM) + BTR(INDX,IP,IM)*SPAV
C
688    CONTINUE
```

```

      IF(TRKFLG.EQ.1) CPRET(IX,IP,IMODE) = CPRET(IX,IP,IMODE)*
     *                                     TRKRET(IX,IP,IM)

00    CONTINUE
      RETURN

      DEBUG SUBCHK
      END
```

A.6 INITEX

```
      SUBROUTINE INITEX
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFIG,ICEVFG,PRTFLG,IFCRE
C
      INTEGER ALTFIG,ALHFLG,TRKFLG,SP3FLG,UNFFLG,PRTFLG
C***********************************************************************
C
      IF (ALTFLG.EQ.1) CALL EFALTX
C
      CALL BEFGEN
C
      CALL CCEVAX
C
C
      RETURN
C
      END
```

A.7 TFCALX

```
      SUBROUTINE TFCALX
C
      COMMON/MYMCOM/MYM,MYR,TF
      REAL TFNORM(6),MYM(20,6),MYR(20,6),TF(20,6)
C
      DO 850 M = 1,6
            TFNORM(M) = 0.0
         DO 810 I = 1,20
810         TFNORM(M) = TFNORM(M)  + MYR(I,M)*MYR(I,M)
         DO 820 I = 1,20
820         TF(21-I,M) =  ( MYM(I,M)*MYR(I,M)  )/TFNORM(M)
C
850   CONTINUE
C
      RETURN
C
C     DEBUG SUBCHK
C
      END
```

A.8 SPFCLX

```
      SUBROUTINE SPFCLX(SPARA,SPBACK)
      COMMON/ACOM/A
      REAL SPARA(3),SPBACK(18,3,3),A(6,18,3)
C
      DO 30 IP = 1,3
         DO 20 IG = 1,18
             IGG = IG
           DO 10 IS = 1,3
               SUM = A(6,IGG,IP)
               S = SPARA(IS)
             DO 5 I = 1,5
              SUM = SUM*S + A(6-I,IGG,IP)
5            CONTINUE
           SCF=EXP(SUM)
           IF(IP.EQ.3) SCF=SUM
           SPBACK(IG,IS,IP) = SCF
10        CONTINUE
20      CONTINUE
30    CONTINUE
      RETURN
C     DEBUG SUBCHK
      END
```

A.9 BEFGEN

```
      SUBROUTINE BEFGEN
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFCHE
      COMMON/BEGCOM/IREJN
      COMMON/BEFCOM/BEF
      COMMON/BASECM/BASE3R
      COMMON/DELCOM/DEL3R
      COMMON/IDLBCM/IDLB3R
      COMMON/IDLDCM/IDEL3R
      COMMON/IDLCOM/IDLBEF
      COMMON/INDXCM/INDX3R
      COMMON/MYMCOM/MYM,MYR,TF
C
      REAL BASE3R(10,3,6,3),DEL3R(10,3,6,3)
      REAL IDLB3R(10,3,6,3),IDEL3R(10,3,6,3)
      REAL BEF(20,26,3,6),IDLBEF(20,26,3,6)
      REAL CUMMIL(20,6),MYM(20,6),MYR(20,6),TF(20,6),NONMTH(45,6)
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,MSFLG,SP3FLG,
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG
      INTEGER INDX3R(30,3,6,3),MAXAGE(6)
C
      DATA MAXAGE/19,19,19,19,19,19/
      DATA NONMTH/
     *               24*.95 , 21*.85 ,
     *               24*.95 , 21*.85 ,
     *               24*.95 ,  4*.95 , 17*.85 ,
     *               24*.95 ,  8*.95 , 13*.85 ,
     *               45*.98 ,
     *               45*.95                    /
C
C***********************************************************************
C
      CALL GETCUM(CUMMIL)
C
C***************************************************
C
      DO 100 IMODE=1,6
C
        MAX = MAXAGE(IMODE)
C
      DO 100 ICY = 70,95
      DO 100 IP = 1,3
        IMY1=ICY-19
        IMY13=ICY
        ICYP=ICY-69
C
      DO 100 MY = IMY1,IMY13
        IMYP = MY-50
        IAGE=ICY-MY
C
```

```
      IF(IAGE.GT.MAX) IAGE = MAX
C
        AGE = IAGE
        IA2=ICY MY+1
        IA3=21-IA2
C
      IF(MY.LT.66) INDX=1
      IF(MY.GE.66) INDX=INDX3R(MY-65,IP,IMODE,IREJN)
C
      VMTAGE = CUMMIL(IAGE+1,IMODE)*.0001
C
      BEF(IA3,ICYP,IP,IMODE) = BASE3R(INDX,IP,IMODE,IREJN) +
     *                 VMTAGE*DEL3R(INDX,IP,IMODE,IREJN)
C
      IDLBEF(IA3,ICYP,IP,IMODE) = IDLB3R(INDX,IP,IMODE,IREJN) +
     *                 VMTAGE*IDEL3R(INDX,IP,IMODE,IREJN)
C
100   CONTINUE
C
      DO 450 I = 1,20
      DO 450 J = 1,26
      DO 450 IM = 1,6
      IF(NMHFLG.EQ.1) BEF(I,J,1,IM) = BEF(I,J,1,IM)*NONMTH(I+J-1,IM)
450   CONTINUE
C
C     DEBUG SUBCHK
C
      RETURN
      END
```

A.10 GETCOM

```
      SUBROUTINE GETCOM(COMMIL)
C
      COMMON/MYMCOM/MYMDUM,MYR,TF
C
      REAL COMMIL(20,6),MYM(20,6),MYMDUM(20,6),MYR(20,6),TF(20,6)
      REAL FRAC(4,6)
      DATA FRAC/
     *           .75 , .375 , .25 , .875 ,
     *           .75 , .375 , .25 , .875 ,
     *           .75 , .375 , .25 , .875 ,
     *           .50 , .25  , .50 , .75  ,
     *           .50 , .25  , .50 , .75  ,
     *           .50 , .25  , .50 , .75     /
C
      DO 10 I1=1,6
      DO 10 I2=1,20
10    MYM(I2,I1) = MYMDUM(I2,I1)*100000.
C
      DO 100 IM=1,6
         COMMIL(1,IM)=MYM(1,IM)*FRAC(2,IM)
      DO 90 I=2,20
         SUM=0.
         SUM2=0.
         II=I 1
      DO 80 J=1,II
80    SUM=SUM+MYM(J,IM)
         III=II 1
         IF(III.EQ.0) GO TO 74
      DO 70 L=1,III
70    SUM2=SUM2+MYM(L,IM)
C
74    CONTINUE
         T1=SUM+MYM(I,IM)*FRAC(2,IM)
         T2=SUM2+MYM(II,IM)*FRAC(4,IM)
         T1=T1*FRAC(1,IM)
         T2=T2*FRAC(3,IM)
         TSUM=T1+T2
90    COMMIL(I,IM)=TSUM
100   CONTINUE
C
C
      RETURN
C
C     DEBUG SUBCHK
      END
```

A.11 EFALTX

```
      SUBROUTINE EFALTX
C
      COMMON/ALTCOM/INTALT(5,100),B4ALT(2,100),MODFLG(100),NEWFAC
      COMMON/INDXCM/INDX3R(30,3,6,3)
      COMMON/BASECM/BASE3R(10,3,6,3)
      COMMON/DELCOM/DEL3R(10,3,6,3)
C
      INTEGER MAXIND(3,6,3)
C
      DO 10 IR=1,3
      DO 10 IM=1,6
      DO 10 IP=1,3
10    MAXIND(IP,IM,IR)=INDX3R(30,IP,IM,IR)
C
      DO 20 IMOD=1,100
20    MODFLG(IMOD) = 0
C
      DO 100 IFAC = 1,NEWFAC
        IREG   = INTALT(1,IFAC)
        IMOD   = INTALT(2,IFAC)
        IPOL   = INTALT(3,IFAC)
        MYFRST = INTALT(4,IFAC)
        MYLAST = INTALT(5,IFAC)
      MAXOLD = MAXIND(IPOL,IMOD,IREG)
      IF(MAXOLD.GE.10) GO TO 100
      NEWMAX = MAXOLD + 1
      MAXIND(IPOL,IMOD,IREG) = NEWMAX
C
        DO 50 IMY = MYFRST,MYLAST
          MY = IMY   65
50      INDX3R(MY,IPOL,IMOD,IREG) = NEWMAX
C
      BASE3R(NEWMAX,IPOL,IMOD,IREG) = B4ALT(1,IFAC)
      DEL3R(NEWMAX,IPOL,IMOD,IREG)  = B4ALT(2,IFAC)
C
      MODFLG(IFAC) = 1
C
100   CONTINUE
C
      RETURN
C
C     DEBUG SUBCHK
C
      END
```

A.12 CCEVAX

```
      SUBROUTINE CCEVAX
C
      COMMON/CEVCOM/CCEVRT
      COMMON/REGCOM/IREJN
C
      INTEGER CY , MY
      REAL CCEV(45,6,3),CCEVRT(45,6),LDGSWD(45),CCCAL(45,4,3)
C     DATA LDGSWD/17*.80,.77,.77,3*.74,2*.72,21*.55/
C
      DATA CCEV/12*6.63,5*3.33,3*2.53,7*1.76,2*0.60,16*0.15,
     *          12*6.63,5*3.33,3*2.53,7*1.76,2*0.60,16*0.15,
     *          17*7.70,11*2.53,1*0.60,16*0.15,
     *          17*7.70,13*2.00,15*0.30,
     *          45*0.,
     *          27*1.60,18*0.,
     *
     *          10*6.63,3*3.33,7*2.53,7*1.76,2*0.60,16*0.15,
     *          10*6.63,3*3.33,7*2.53,7*1.76,2*0.60,16*0.15,
     *          17*7.70,10*2.53,2*0.60,16*0.15,
     *          17*7.70,7*2.00,2*1.19,3*0.87,16*0.30,
     *          45*0.,
     *          27*1.60,18*0.,
     *
     *          12*9.00,5*4.52,3*3.44,6*2.39,1*1.76,2*0.81,4*.2,12*.15,
     *          12*9.00,5*4.52,3*3.44,6*2.39,1*1.76,2*0.81,4*.2,12*.15,
     *          17*10.46,9*2.72,2.00,2.72,0.81,4*0.20,12*0.15,
     *          17*10.46,16*2.72,12*0.30,
     *          45*0.,
     *          27*2.17,18*0.      /
C
C
      DO 100 IMODE = 1,6
      DO 90 MY = 1,45
C
      CCEVRT(MY,IMODE) = CCEV(MY,IMODE,IREJN)
C
90    CONTINUE
100   CONTINUE
C
C
      RETURN
C     DEBUG SUBCHK
      END
```

A.13 LDVIMX

```
      SUBROUTINE LDVIMX
C
      COMMON/BEFCOM/BEF(20,26,3,6)
      COMMON/IMCOM/ICYIM,ISTRN,IMTFLG,MODYR1,MODYR2
      COMMON/IMCREL/PCIM
C
      INTEGER CY,CYP,CYIMP,CYIP1,DELY,DEL2,DEL
      INTEGER PCIM(19,5,4,2,2)
C**IN PCIM: DEL,ISTRIN,ITECH,IPROGM,IPCI
C
C*******************************************************************************
C
      IPROGM = 1 + IMTFLG
C     ISTRIN = .1*ISTRN
      IF(ISTRN.LT.10.OR.ISTRN.GT.50) STOP
      IREM = ISTRN   (ISTRN/10)*10
      REM=IREM*.1
C     ISTRIN = ISTRN*.1
      STRN = (ISTRN + 0.5)*0.1
      ISTRIN = STRN
      CYIMP = ICYIM
      CYIP1 = ICYIM + 1
C
      DO 100 IPOL=1,2
      DO 100 CY = CYIP1,95
:
            CYP = CY 69
            DELY = CY - CYIMP
C
      DO 90 I = 1,20
         MY = CY - (20-I)
         MYP = MY - 50
         DEL2 = MY - CYIMP
C
      IF(MY.LT.MODYR1.OR.MY.GT.MODYR2) GO TO 90
C
      IF(MY.LE.CYIMP) DEL = DELY
      IF(MY.GT.CYIMP) DEL = DELY - DEL2
      IF(DEL.GT.19) DEL = 19
C
C*TEST FOR TECH  I, II, III, OR IV
      IF(MY.LT.75) ITECH = 1
      IF(MY.GE.75.AND.MY.LE.79) ITECH = 2
      IF(MY.EQ.80) ITECH = 3
      IF(MY.GE.81) ITECH = 4
C
      IF(DEL.EQ.0) PCRED = 0.0
      IF(DEL.GT.0.AND.ISTRIN.LT.5)
     * PCRED = PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL)*.01
     *  + REM*(PCIM(DEL,ISTRIN+1,ITECH,IPROGM,IPOL) -
     *          PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL) )*.01
C
```

```
      IF(DEL.GT.0.AND.ISTRIN.EQ.5)
     * PCRED = PCIN(DEL,ISTRIN,ITECH,IPROGE,IPOL)*.01
C
C*PERHAPS SKIP FOR LDT?
      PCLEFT = 1. - PCRED
C
      BEF(I,CYP,IPCL,1) = BEF(I,CYP,IPCL,1)*PCLEFT
C
90    CONTINUE
100   CONTINUE
C
      RETURN
C
C     DEBUG SUBCHK
C
      END
```

A.14 ALUH

```
      SUBROUTINE ALUH(CY,AC,XLOAD,TRAILR,PCCO,PCCC,ABSHUM)
C
      COMMON/RET1/ALHRET(20,4,3)
C
      INTEGER CY
      REAL XLOAD(3)
      REAL PCW(20)
      REAL A(20,3,3),U(20,3,3),L(3,3),H(3)
      REAL TCFA(3),TCFB(3),TCFC(3)
      REAL CFLD(3)
      REAL ACCF(3),PCWAC(45)
C
      DATA ACCF/1.13,1.18,1.18/
      DATA CFLD/1.06,1.20,1.03/
      DATA PCWAC/15*.54,3*.66,4*.75,3*.81,20*.81/
      DATA TCFA/1.32,2.15,1.16/,TCFB/.75,1.55,1.28/,TCFC/.43,.39,.92/
C  IN TCFA ABOVE, 2ND VALUE SHOULD BE 2.15..IT IS 1.15 FOR ORG. CP.
C
      PCCOLD=PCCC*.01
C
      DO 207 IP=1,3
      H(IP)=1.
      DO 207 IM=1,3
      L(IP,IM)=1.
      DO 207 IT=1,20
      A(IT,IP,IM)=1.
      U(IT,IP,IM)=1.
      ALHRET(IT,4,IP) = 1.
207   CONTINUE
C
      DO 500 IP = 1,3
C
      DO 400 IMODE=1,3
C
      IF(IMODE.EQ.3) GO TO 15
C*****A:  AIR CONDITIONING CORRECTION FACTOR
      DO 90 I=1,20
      IMY = CY - (20-I) - 50
      PCW(I)=PCWAC(IMY)
      A(I,IMODE,IP) = AC*PCWAC(IMY)*(ACCF(IP)-1.) + 1.0
90    CONTINUE
C
      IF(IMODE.EQ.2) GO TO 15
C*****U:  TRAILER TOWING CORRECTION FACTOR
      DO 91 I=1,20
      IMY=CY-(20-I)-50
      IF(IMY.GT.24) GO TO 77
      CFA=TCFA(IP)
      GO TO 78
77    CONTINUE
      CFA=(PCCOLD*TCFA(IP) + (1.-PCCOLD)*TCFB(IP))/
     *             (PCCOLD + (1.-PCCOLD)*TCFC(IP))
```

```
78    CONTINUE
C
      U(I,IMODE,IP) = TRAILR*(CFA-1.) + 1.0
C
91    CONTINUE
C
C
15    CONTINUE
C*****L:  ADDITIONAL LOADING CORRECTION FACTOR
      L(IMODE,IP) = XLOAD(IMODE)*(CFLD(IP)-1.) + 1.
C
400   CONTINUE
500   CONTINUE
C*****H:  HUMIDITY CORRECTION FACTOR
      DO 675 IMODE=1,3
      H(IMODE) = 1. - .0047*(ABSHUM - 75.)
675   CONTINUE
C
C
      DO 800 IP=1,3
      DO 800 IMODE=1,3
      DO 800 IY=1,20
      ALHTMP = A(IY,IMODE,IP)*U(IY,IMODE,IP)*L(IMODE,IP)
      IF(IP.EQ.3) ALHTMP = ALHTMP*H(IMODE)
      ALHNET(IY,IMODE,IP) = ALHTMP
800   CONTINUE
C
      RETURN
C     DEBUG SUBCHK
      END
```

A.15 TRKOPC

```
      SUBROUTINE TRKOPC(CY,HGWGT,HDWGT,HGCID,HDCID)
C
      COMMON/RET2/TRKRET(20,3,2)
      INTEGER CY,INDXAR(45)
C**IN B0,B1,AND B2, 1ST INDEX IS YEAR GROUP, 2ND IS VEHTYPE,3RD IS POL
      REAL B0(3,2,3),B1(3,2,3),B2(3,2,3)
C
      DATA B0/1.302,-.584,.762,2.058,2.058,.893,
     *         .814,.354,.320,-.533,-.533,-.299,
     *         .869,.883,.943,.085,.085,.138      /
C
      DATA B1/.177,.124,.131,-.005, .005,.015,
     *         .036,.106,.149,-.03, .03,.03,
     *         .172,.016,.008,.02,.02,.023        /
C
      DATA B2/-.065,-.01,-.047,-.014,-.014, .006,
     *         .016, .024, .045,.043,.043,.003,
     *         -.054,-.003,-.012,.002,.002,.001  /
C
      DATA INDXAR/19*1,4*2,22*3/
C
      DO 100 IMY=1,20
         MY = CY - (20-IMY)    50
         IX=INDXAR(MY)
C
      DO 100 IPOL = 1,3
C
      TRKRET(IMY,IPOL,1) = B0(IX,1,IPOL) + B1(IX,1,IPOL)*HGWGT*.001 +
     *                     B2(IX,1,IPOL)*HGWGT/HGCID
C
      TRKRET(IMY,IPOL,2) = B0(IX,2,IPOL) + B1(IX,2,IPOL)*HDWGT*.001 +
     *                     B2(IX,2,IPOL)*HDWGT/HDCID
C
100   CONTINUE
C
      RETURN
C     DEBUG SUBCHK
      END
```

A.16 BDSPD

```
      BLOCK DATA
C
      COMMON/ACOM/AIN1,AIN2,AIN3
C
      REAL AIN1(6,18),AIN2(6,18),AIN3(6,18)
C
C**HC SPEED CORRECTION FACTOR COEFFICIENTS
      DATA AIN1/
     *2.2461, .29057,0.015889,-.47249E-03,0.69408E-05,-.39280E-07,
     *2.3103, .28957,0.015299,-.44669E-03,0.64818E-05,-.36346E-07,
     *2.1656, .26959,0.014420,-.43364E-03,0.65074E-05,-.37810E-07,
     *2.3973, .29958,0.016135,-.48749E-03,0.72909E-05,-.41977E-07,
     *2.4087, .30819,0.016817,-.50684E-03,0.75385E-05,-.43160E-07,
     *2.2322, .28459,0.015383,-.45674E-03,0.67349E-05,-.38380E-07,
     *2.2522, .28778,0.015682,-.47318E-03,0.70795E-05,-.40846E-07,
     *2.0278, .27305,0.015360,-.46030E-03,0.67853E-05,-.38488E-07,
     *2.1506, .28362,0.015380,-.44214E-03,0.62873E-05,-.34631E-07,
     *2.2302, .29365,0.016240,-.48415E-03,0.71159E-05,-.40286E-07,
     *2.1223, .29107,0.016910,-.52615E-03,0.80271E-05,-.47012E-07,
     *2.1536, .28345,0.015700,-.46976E-03,0.69383E-05,-.39471E-07,
     *2.0735, .28935,0.017300,-.55471E-03,0.86420E-05,-.51311E-07,
     *2.3495, .30496,0.016842,-.50962E-03,0.75952E-05,-.43496E-07,
     *2.1134, .28568,0.016320,-.50079E-03,0.75507E-05,-.43719E-07,
     *2.1194,-.29863,0.018450,-.61654E-03,0.99206E-05,-.60402E-07,
     *2.6838, .34463,0.019542,-.62572E-03,0.97844E-05,-.58337E-07,
     *2.3954, .33578,0.021161,-.73155E-03,0.12072E-04,-.74857E-07/
C
C**CO SPEED CORRECTION FACTOR COEFFICIENTS
      DATA AIN2/
     *  1.8198, .25466,.015235,-.48740E-03,.75821E-05,-.44951E-07,
     *  2.3399, .29698,.016007,-.47740E-03,.70675E-05,-.40398E-07,
     *  2.4415, .29147,.014296,-.38785E-03,.52978E-05,-.28244E-07,
     *  2.4655, .30502,.016050,-.47397E-03,.69908E-05,-.39576E-07,
     *  2.7780, .31913,.015318,-.42233E-03,.58495E-05,-.31497E-07,
     *  2.7890, .32711,.016294,-.46757E-03,.67191E-05,-.37440E-07,
     *  2.7074, .33131,.017618,-.53858E-03,.81740E-05,-.47780E-07,
     *  1.8692,-.27668,.017233,-.55828E-03,.87168E-05,-.51698E-07,
     *  1.8213, .27205,.017030,-.55202E-03,.86254E-05,-.51144E-07,
     *  2.0142, .29519,.018635,-.62161E-03,.99366E-05,-.59578E-07,
     *  2.0453, .31062,.020485,-.70853E-03,.11621E-04,-.71569E-07,
     *  2.3187, .34115,.020945,-.66589E-03,.10223E-04,-.59827E-07,
     *  2.5752, .32889,.018975,-.62826E-03,.10092E-04,-.61273E-07,
     *  2.6845, .33282,.017628,-.52412E-03,.77222E-05,-.43702E-07,
     *  2.1549, .32912,.021011,-.68906E-03,.10839E-04,-.64712E-07,
     *  2.5456, .36285,.023277,-.81504E-03,.13623E-04,-.85591E-07,
     *  2.8393, .36876,.021076,-.67644E-03,.10627E-04,-.63641E-07,
     *  2.4875, .39156,.027072,-.97618E-03,.16527E-04,-1.0432E-07/
C
```

```
C**NOX SPEED CORRECTION FACTOR COEFFICIENTS
      DATA AIN3/
     *  2.4442,-.250110,1.3829E-02,-.28703E-03,.20758E-05,0.0,
     *  1.6863, .118300,.65497E-02,-.13714E-03,.10085E-05,0.0,
     *  1.1265, .039340,.26864E-02,-.60802E-04,.47729E-06,0.0,
     *  1.2268,-.044498,.26248E-02,-.56715E-04,.43429E-06,0.0,
     *  1.0174, .011896,.91437E-03,-.21574E-04,.18230E-06,0.0,
     *  .98760, .019567,.16964E-02,-.40400E-04,.32800E-06,0.0,
     *  1.1592, .044454,.29643E-02,-.66899E-04,.52236E-06,0.0,
     *  1.8866,-.161290,.90499E-02,-.18561E-03,.13256E-05,0.0,
     *  1.5578, .113030,.67183E-02,-.14341E-03,.10608E-05,0.0,
     *  2.0452, .194010,.11074E-01,-.23175E-03,.16837E-05,0.0,
     *  1.6326, .121860,.70302E-02,-.14629E-03,.10614E-05,0.0,
     *  1.4482, .122440,.79502E-02,-.17108E-03,.12578E-05,0.0,
     *  .24597,.084195,-.34084E-02,.62988E-04,-.41397E-06,0.0,
     *  1.2817, .080487,.53574E-02,-.11889E-03,.90106E-06,0.0,
     *  1.5345, .125670,.78592E-02,-.16943E-03,.12549E-05,0.0,
     *  .70481,.038153,-.17391E-02,.32614E-04,-.20385E-06,0.0,
     *  .78384,.32855E-03,.10603E-02,-.31935E-04,.29039E-06,0.0,
     *  .94213, .042324,.38625E-02,-.93985E-04,.75388E-06,0.0  /
C
      END
```

A.17 BDMYMR

```
      BLOCK DATA
C
      COMMON/MYMCOM/MYM,MYR,TF
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,MS
C
      REAL SPD(3),MS(6),MYM(20,6),MYR(20,6),TF(20,6)
C
C**DEFAULT MODAL SPLIT
      DATA MS/.803,.058,.058,.045,.031,.005/
C
C**ANNUAL AVERAGE MILEAGE ACCUMULATION (DIVIDED BY 100000)
      DATA MYM/
     *0.159,0.150,0.140,0.131,0.122,0.113,0.103,0.094,0.085,0.076,
     *0.067,0.066,0.062,0.059,0.055,0.051,0.050,0.047,0.044,0.044,
     *0.159,0.150,0.140,0.131,0.122,0.113,0.103,0.094,0.085,0.076,
     *0.067,0.066,0.062,0.059,0.055,0.051,0.050,0.047,0.044,0.044,
     *0.157,0.157,0.141,0.126,0.113,0.102,0.094,0.086,0.080,0.075,
     *0.071,0.066,0.063,0.060,0.055,0.052,0.050,0.047,0.044,0.041,
     *0.190,0.190,0.179,0.165,0.150,0.135,0.120,0.106,0.095,0.086,
     *0.078,0.070,0.063,0.059,0.053,0.049,0.047,0.046,0.044,0.042,
     *0.736,0.736,0.699,0.633,0.566,0.500,0.456,0.412,0.382,0.360,
     *0.346,0.338,0.331,0.324,0.309,0.287,0.257,0.213,0.184,0.154,
     *.0201,.0251,.0207,.0185,.0172,.0162,.0155,.0149,.0143,.0139,
     *,0135,.0132,.0129,.0127,.0125,.0123,.0122,.0121,.0120,.0119/
C
C**VEHICLE REGISTRATION DISTRIBUTICNS
      DATA MYR/
     *0.075,0.107,0.107,0.106,0.100,0.092,0.085,0.077,0.066,0.052,
     *0.039,0.027,0.018,0.014,0.009,0.006,0.005,0.005,0.005,0.004,
     *0.061,0.095,0.094,0.103,0.083,0.076,0.076,0.063,0.054,0.043,
     *0.036,0.024,0.030,0.028,0.026,0.024,0.022,0.020,0.018,0.016,
     *0.037,0.070,0.078,0.086,0.075,0.075,0.075,0.068,0.059,0.053,
     *0.044,0.032,0.038,0.036,0.034,0.032,0.030,0.028,0.026,0.024,
     *0.037,0.070,0.078,0.086,0.075,0.075,0.075,0.068,0.059,0.053,
     *0.044,0.032,0.038,0.036,0.034,0.032,0.030,0.028,0.026,0.024,
     *0.077,0.135,0.134,0.131,0.099,0.090,0.082,0.062,0.045,0.033,
     *0.025,0.015,0.013,0.011,0.010,0.008,0.007,0.006,0.005,0.004,
     *0.105,0.225,0.206,0.149,0.097,0.062,0.046,0.033,0.029,0.023,
     *0.008,0.005,0.013,0.0  ,0.0  ,0.0  ,0.0  ,0.0  ,0.0  ,0.0  /
C
       END
```

A.18 BDE123

```
      BLOCK DATA
C
      COMMON/INDXCM/INDX49,INDXCA,INDXHI
      COMMON/BASECM/BASE49,BASECA,BASEHI
      COMMON/DELCOM/ DEL49, DELCA, DELHI
C
      INTEGER INDX49(30,3,6),INDXCA(30,3,6),INDXHI(30,3,6)
      REAL BASE49(10,3,6),BASECA(10,3,6),BASEHI(10,3,6)
      REAL DEL49 (10,3,6),DELCA (10,3,6),DELHI (10,3,6)
C
C     6 6 6 6 7 7 7 7 7 7 7 7 7 7 8 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9
C     6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
      DATA INDX49/
     *1,1,2,2,2,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,2,2,2,2,2,2,2,3,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,2,2,2,2,2,3,3,4,4,5,5,5,5,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,
     *1,1,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,2,2,2,2,2,3,3,4,4,4,4,5,5,5,5,5,5,6,6,6,6,6,6,6,6,6,6,6,
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4 /
C
C     6 6 6 6 7 7 7 7 7 7 7 7 7 7 8 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9
C     6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
      DATA INDXCA/
     *2,2,2,2,2,2,2,2,2,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *2,2,2,2,2,2,2,2,2,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *2,2,2,2,2,2,2,3,3,4,4,5,5,5,6,7,7,7,7,7,7,7,7,7,7,7,7,7,7,7,
     *1,1,2,2,2,2,2,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,2,2,2,2,2,2,2,3,3,3,4,5,5,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,
     *1,1,2,2,2,2,2,3,3,4,4,4,4,5,5,6,6,7,7,7,7,7,7,7,7,7,7,7,7,7,
     *1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,2,2,2,2,3,3,4,4,5,5,5,6,6,6,7,7,7,7,7,7,7,7,7,7,7,7,7,
     *1,1,1,2,2,2,2,3,3,4,4,5,5,5,5,5,5,6,6,6,6,6,6,6,6,6,6,6,6,6,
     *1,1,1,2,2,2,2,3,3,4,4,5,5,5,6,6,6,6,6,7,7,7,7,7,7,7,7,7,7,7,
     *1,1,1,1,1,1,1,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,2,2,2,2,3,3,3,4,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4 /

      6 6 6 6 7 7 7 7 7 7 7 7 7 7 8 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9
      6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
      DATA INDXEI/
     *1,1,2,2,2,2,2,2,2,3,3,4,5,5,6,7,7,7,8,8,8,8,8,8,8,8,8,8,8,8,
     *1,1,2,2,2,2,2,2,2,3,3,4,5,5,6,7,7,7,8,8,8,8,8,8,8,8,8,8,8,8,
     *1,1,2,2,2,2,2,3,3,4,4,5,6,6,7,8,8,8,9,9,9,9,9,9,9,9,9,9,9,9,
     *1,1,2,2,2,2,2,2,2,3,3,4,5,6,6,6,6,7,8,8,8,8,8,8,8,8,8,8,8,8,
     *1,1,2,2,2,2,2,2,2,3,3,4,5,6,6,6,6,7,8,8,8,8,8,8,8,8,8,8,8,8,
     *1,1,2,2,2,2,2,3,3,4,4,5,6,7,7,7,7,7,8,9,9,9,9,9,9,9,9,9,9,9,
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,6,6,6,6,6,6,6,6,6,6,6,6,
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,6,6,6,6,6,6,6,6,6,6,6,6,
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,4,5,6,6,6,6,6,6,6,6,6,6,6,
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5 /
C
C***EXHAUST EMISSION FACTOR INTERCEPT: 49 STATE
      DATA BASE49/
     *  4.45,  2.43,  1.13,  0.13,  0.13,  0.13, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 68.30, 31.14, 18.60,  3.00,  1.40,  1.40, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  3.58,  4.43,  2.98,  2.42,  1.50,  0.29, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  4.45,  2.43,  1.11,  0.94,  0.31,  0.31, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 68.30, 31.14, 16.10, 14.50,  3.87,  3.87, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  3.58,  4.43,  2.98,  2.45,  1.73,  0.41, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  5.99,  2.90,  0.94,  0.31,  0.31,  0.31, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 78.70, 32.40, 14.50,  3.87,  3.87,  3.87, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  6.49,  5.04,  1.73,  0.41,  0.41,  0.41, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 23.90, 18.54, 22.02,  5.22,  1.46,  1.46, 0.0 , 0.0 , 0.0 , 0.0 ,
     *272.90,212.70,216.80,191.90, 15.38, 15.38, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  8.80, 12.80, 10.50,  9.10,  3.99,  3.99, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  4.30,  4.50,  4.50,  2.85,  2.85,  2.85, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 35.10, 27.00, 27.00, 27.00, 27.00, 27.00, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 21.40, 20.10, 19.90,  5.35,  5.35,  5.35, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  8.96,  4.70,  3.82,  0.29,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 34.40, 20.27, 14.86,  2.71,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.14,  0.28,  0.56,  0.04,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /
C
C***EXHAUST EMISSION FACTOR INTERCEPT: CALIFORNIA
      DATA BASECA/
     *  4.45,  2.00,  0.29,  0.15,  0.15,  0.15, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 68.30, 30.42,  3.80,  3.80,  3.00,  3.00, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  3.58,  3.92,  3.12,  1.50,  1.10,  0.29, 0.21, 0.0 , 0.0 , 0.0 ,
     *  4.45,  2.43,  1.11,  0.29,  0.15,  0.15, 0.15, 0.0 , 0.0 , 0.0 ,
     * 68.30, 31.14, 16.10, 13.70,  3.80,  3.80, 3.80, 0.0 , 0.0 , 0.0 ,
     *  3.58,  4.43,  2.98,  1.50,  1.28,  0.54, 0.21, 0.0 , 0.0 , 0.0 ,
     *  5.99,  2.90,  0.29,  0.16,  0.16,  0.16, 0.16, 0.0 , 0.0 , 0.0 ,
     * 78.70, 32.40, 13.70,  3.80,  3.80,  3.80, 3.80, 0.0 , 0.0 , 0.0 ,00010700
     *  6.49,  5.04,  1.73,  0.44,  0.44,  0.44, 0.44, 0.0 , 0.0 , 0.0 ,00010800
     * 23.90, 18.54, 22.02, 18.16,  5.22,  3.50, 1.46, 0.0 , 0.0 , 0.0 ,00010900
     *272.90,212.70,218.80,209.00,191.90, 15.38,15.38, 0.0 , 0.0 , 0.0 ,00011000
     *  8.80, 12.80, 10.50,  7.50,  8.04,  6.20, 3.99, 0.0 , 0.0 , 0.0 ,00011100
     *  4.30,  4.50,  4.50,  2.85,  2.85,  2.85, 2.85, 0.0 , 0.0 , 0.0 ,00011200
     * 35.10, 27.00, 27.00, 27.00, 27.00, 27.00,27.00, 0.0 , 0.0 , 0.0 ,00011300
     * 21.40, 20.10, 16.61, 16.30,  5.35,  5.35, 5.35, 0.0 , 0.0 , 0.0 ,00011400
     *  8.96,  4.70,  3.82,  0.82,  0.29,  0.29, 0.29, 0.29, 0.29, 0.29,00011500
     * 34.40, 20.27, 14.86,  2.71,  2.71,  2.71, 2.71, 2.71, 2.71, 2.71,00011600
     *  0.14,  0.28,  0.56,  0.04,  0.04,  0.04, 0.04, 0.04, 0.04, 0.04/00011700
                                                                        00011800
C                                                                       00011900
C***EXHAUST EMISSION FACTOR INTERCEPT: HIGH ALTITUDE                    00012000
      DATA BASEHI/
     *  6.03,  4.07,  1.83,  0.70,  1.83,  0.21, 0.21, 0.13, 0.13, 0.13,00012100
     *110.04, 76.73, 38.31, 10.30, 38.31,  6.18, 2.88, 1.40, 1.40, 1.40,00012200
     *  1.96,  3.00,  1.94,  1.50,  1.90,  1.50, 0.93, 0.18, 0.29, 0.29,00012300
     *  6.03,  4.07,  1.79,  1.11,  1.79,  1.52, 0.47, 0.31, 0.0 , 0.0 ,00012400
     *110.04, 76.73, 33.15, 16.10, 33.15, 29.90, 8.00, 3.87, 0.0 , 0.0 ,00012500
     *  1.96,  3.00,  1.94,  1.52,  2.45,  1.52, 1.07, 1.73, 0.41, 0.0 ,00012600
     *  8.12,  4.86,  1.52,  0.47,  0.31,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,00012700
     *127.30, 79.90, 29.90,  8.00,  3.87,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,00012800
     *  3.55,  3.41,  1.97,  1.73,  0.41,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,00012900
     * 32.40, 31.05, 36.77,  8.74,  2.35,  1.46, 0.0 , 0.0 , 0.0 , 0.0 ,00013000
     *441.50,344.20,353.20,310.90, 31.70, 15.38, 0.0 , 0.0 , 0.0 , 0.0 ,00013100
     *  4.82,  8.67,  6.84,  5.92,  5.64,  3.99, 0.0 , 0.0 , 0.0 , 0.0 ,00013200
     *  5.80,  6.10,  6.10,  3.85,  2.85,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,00013300
     * 56.80, 43.70, 43.70, 43.70, 27.00,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,00013400
     * 11.80, 13.10, 12.90,  5.35,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,00013500
     * 12.10,  7.97,  6.38,  0.45,  0.29,  0.29, 0.29, 0.29, 0.29, 0.29,00013600
     * 47.10, 27.80, 20.40,  5.58,  2.71,  2.71, 2.71, 2.71, 2.71, 2.71,00013700
     *  0.08,  0.18,  0.36,  0.03,  0.04,  0.04, 0.04, 0.04, 0.04,  0.0/00013800
C                                                                       00013900
C***EXHAUST EMISSION FACTOR SLOPE: 49 STATE                             00014000
      DATA DEL49/                                                       00014100
     * 0.58, 0.53, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,      00014200
     * 3.06, 6.15, 2.80, 2.30, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,      00014300
     * 0.0 , 0.0 , 0.0 , 0.08, 0.16, 0.22, 0.0 , 0.0 , 0.0 , 0.0 ,      00014400
     * 0.58, 0.53, 0.41, 0.41, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,      00014500
     * 3.06, 6.15, 5.34, 5.34, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,      00014600
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.11, 0.22, 0.0 , 0.0 , 0.0 , 0.0 ,      00014700
     * 0.58, 0.53, 0.41, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,      00014800
     * 3.06, 6.15, 5.34, 2.00, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,      00014900
     * 0.0 , 0.0 , 0.11, 0.22, 0.22, 0.22, 0.0 , 0.0 , 0.0 , 0.0 ,      00015000
     * 0.58, 0.53, 0.53, 0.53, 1.06, 1.06, 0.0 , 0.0 , 0.0 , 0.0 ,      00015100
     * 3.06, 6.15, 6.15, 6.15,10.54,10.54, 0.0 , 0.0 , 0.0 , 0.0 ,      00015200
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.34, 0.34, 0.0 , 0.0 , 0.0 , 0.0 ,      00015300
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      00015400
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      00015500
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      00015600
     * 1.17, 1.03, 1.03, 0.23, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      00015700
     * 1.54, 4.00, 4.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      00015800
     * 0.0 , 0.0 , 0.0 , 0.22, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0   /    00015900
                                                                        00016000
C
```

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C***EXHAUST EMISSION FACTOR SLOPE: CALIFORNIA
      DATA DELCA/
     * 0.58, 0.70, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 3.06, 6.40, 2.33, 2.33, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.16, 0.16, 0.22, 0.22, 0.0 , 0.0 , 0.0 ,
     * 0.58, 0.53, 0.41, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 ,
     * 3.06, 6.15, 5.34, 5.34, 2.33, 2.00, 2.00, 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.11, 0.22, 0.22, 0.22, 0.0 , 0.0 , 0.0 ,
     * 0.58, 0.53, 0.23, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 ,
     * 3.06, 6.15, 5.34, 2.00, 2.00, 2.00, 2.00, 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.11, 0.22, 0.22, 0.22, 0.22, 0.0 , 0.0 , 0.0 ,
     * 0.58, 0.53, 0.53, 0.53, 0.53, 0.53, 1.06, 0.0 , 0.0 , 0.0 ,
     * 3.06, 6.15, 6.15, 5.15, 6.15,10.54,10.54, 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.34, 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.58, 0.53, 0.53, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23,
     * 3.06, 6.15, 6.15, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00,
     * 0.0 , 0.0 , 0.0 , 0.22, 0.22, 0.22, 0.22, 0.22, 0.22, 0.22 /
C
C***EXHAUST EMISSION FACTOR SLOPE: HIGH ALTITUDE
      DATA DELHI/
     * 0.55, 0.55, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23,
     * 2.81, 4.24, 2.80, 2.80, 2.80, 2.30, 2.00, 2.00, 2.00, 2.00,
     * 0.0 , 0.0 , 0.0 , 0.08, 0.16, 0.16, 0.16, 0.22, 0.22, 0.22,
     * 0.55, 0.55, 0.41, 0.41, 0.41, 0.41, 0.23, 0.23, 0.0 , 0.0 ,
     * 2.81, 4.24, 5.34, 5.34, 5.34, 5.34, 2.00, 2.00, 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.11, 0.11, 0.22, 0.0 ,
     * 0.55, 0.55, 0.41, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 2.81, 4.24, 5.34, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.11, 0.11, 0.22, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.55, 0.55, 0.55, 0.55, 1.06, 1.06, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 2.81, 4.24, 4.24, 4.24,10.54,10.54, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.34, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.55, 0.55, 0.55, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23,
     * 2.81, 4.24, 4.24, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00,
     * 0.0 , 0.0 , 0.0 , 0.22, 0.22, 0.22, 0.22, 0.22, 0.22, 0.22 /
C
      END
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A.19 BDI123

```
      BLOCK DATA
C
      COMMON/IDLBCM/IDLB49,IDLBCA,IDLBHI
      COMMON/IDLDCM/IDEL49,IDELCA,IDELHI
C
      REAL IDLB49(10,3,6),IDLBCA(10,3,6),IDLBHI(10,3,6)
      REAL IDEL49(10,3,6),IDELCA(10,3,6),IDELHI(10,3,6)
C
C***IDLE EMISSION FACTOR INTERCEPT: 49 STATE
       DATA IDLB49/
     *  2.01,  0.68,  0.27,  0.03,  0.07,  0.07, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 16.42, 12.73,  5.43,  0.88,  0.41,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.16,  0.26,  0.16,  0.36,  0.22,  0.04, 0.2 , 0.0 , 0.0 , 0.0 ,
     *  2.01,  0.68,  0.28,  0.24,  0.08,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 16.42, 12.73,  2.02,  1.82,  0.49,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.16,  0.26,  0.16,  0.25,  0.18,  0.04, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  2.93,  1.86,  0.24,  0.08,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 17.24, 18.62,  1.82,  0.49,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.18,  0.27,  0.18,  0.04,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  3.85,  0.71,  3.09,  0.73,  0.20,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 24.63, 15.70, 21.92, 19.23,  1.54,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.02,  0.04,  0.02,  0.02,  0.01,  0.01, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.50,  0.40,  0.40,  0.25,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  1.32,  0.66,  0.66,  0.66,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  1.11,  1.00,  0.99,  0.27,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  4.05,  2.12,  1.72,  0.13,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  8.27,  4.87,  3.57,  0.65,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /
     *  0.01,  0.02,  0.04,  0.01,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0
C
C***IDLE EMISSION FACTOR INTERCEPT: CALIFORNIA
       DATA IDLBCA/
     *  2.01,  0.93,  0.04,  0.02,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 16.42, 15.02,  0.18,  0.18,  0.14,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.16,  0.24,  0.07,  0.11,  0.08,  0.02, 0.02, 0.0 , 0.0 , 0.0 ,
     *  2.01,  0.68,  0.28,  0.07,  0.04,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 16.42, 12.73,  2.02,  1.72,  0.48,  0.48, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.16,  0.26,  0.16,  0.25,  0.21,  0.09, 0.04, 0.0 , 0.0 , 0.0 ,
     *  2.93,  1.86,  0.07,  0.04,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 17.24, 18.62,  1.72,  0.48,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.18,  0.27,  0.25,  0.09,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  3.85,  0.71,  3.09,  0.18,  0.05,  0.03, 0.01, 0.0 , 0.0 , 0.0 ,
     * 24.63, 15.70, 21.92,  4.40,  4.04,  0.32, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.02,  0.04,  0.02,  0.05,  0.05,  0.04, 0.03, 0.0 , 0.0 , 0.0 ,
     *  0.50,  0.40,  0.40,  0.25,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  1.32,  0.66,  0.66,  0.66,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  1.11,  1.00,  0.93,  0.81,  0.27,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  3.46,  1.81,  1.48,  0.32,  0.11,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 11.57,  6.82,  5.00,  0.91,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /
     *  0.01,  0.02,  0.04,  0.01,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0
C
```

```
C***IDLE EMISSION FACTOR INTERCEPT: HIGH ALTITUDE
      DATA IDLBHI/
     *  2.29,  1.04,  0.24,  0.17,  0.24,  0.05, 0.05, 0.03, 0.0 , 0.0 ,
     * 20.70, 20.71,  4.48,  3.01,  4.48,  1.81, 0.84, 0.41, 0.0 , 0.0 ,
     *  0.26,  0.19,  0.08,  0.06,  0.28,  0.06, 0.14, 0.02, 0.04, 0.0 ,
     *  2.29,  1.04,  0.22,  0.28,  0.22,  0.39, 0.12, 0.08, 0.0 , 0.0 ,
     * 20.70, 20.71,  5.60,  2.02,  5.60,  3.75, 1.01, 0.49, 0.0,  0.0,
     *  0.26,  0.19,  0.08,  0.04,  0.25,  0.04, 0.11, 0.18, 0.04, 0.0 ,
     *  3.40,  3.50,  0.39,  0.12,  0.08,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 38.84, 48.25,  3.75,  1.01,  0.49,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.10,  0.17,  0.11,  0.18,  0.04,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  4.46,  1.34,  5.82,  1.22,  0.32,  0.20, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 55.59, 40.68, 56.80, 31.15,  3.17,  1.54, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.01,  0.03,  0.02,  0.01,  0.01,  0.01, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.58,  0.75,  0.75,  0.34,  0.25,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  2.97,  1.71,  1.71,  1.71,  0.66,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.64,  0.64,  0.64,  0.27,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  4.01,  3.59,  2.87,  0.20,  0.13,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 26.07,  6.68,  4.90,  1.34,  0.65,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.01,  0.01,  0.03,  0.01,  0.04,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /
C
C***IDLE EMISSION FACTOR SLOPE: 49 STATE
      DATA IDEL49/
     * 0.18, 0.20, 0.07, 0.07, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 2.55, 2.92, 0.83, 0.67, 0.59, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.03, 0.06, 0.08, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.18, 0.20, 0.19, 0.19, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 2.55, 2.92, 1.56, 1.56, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.02, 0.01, 0.02, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.18, 0.20, 0.19, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 2.55, 2.92, 1.56, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.01, 0.02, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.18, 0.20, 0.20, 0.20, 0.40, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 2.55, 2.92, 2.92, 2.92, 5.00, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.36, 0.62, 0.62, 0.10, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 1.28, 1.12, 1.12, 0.48, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0    /
C
C***IDLE EMISSION FACTOR SLOPE: CALIFORNIA
      DATA IDELCA/
     * 0.18, 0.31, 0.01, 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 2.55, 3.15, 0.08, 0.08, 0.36, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.18, 0.20, 0.19, 0.05, 0.05, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 2.55, 2.92, 1.56, 1.56, 0.29, 0.29, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.02, 0.04, 0.04, 0.04, 0.0 , 0.0 , 0.0 ,
     * 0.18, 0.20, 0.05, 0.05, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 2.55, 2.92, 1.56, 0.29, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.02, 0.04, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.18, 0.20, 0.20, 0.20, 0.20, 0.20, 0.40, 0.0 , 0.0 , 0.0 ,
     * 2.55, 2.92, 2.92, 2.92, 2.92, 5.00, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.31, 0.28, 0.28, 0.12, 0.12, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 1.80, 3.61, 3.61, 1.18, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0   /
C
C***IDLE EMISSION FACTOR SLOPE: HIGH ALTITUDE
      DATA IDELHI/
     * 0.21, 0.14, 0.02, 0.07, 0.07, 0.07, 0.07, 0.07, 0.0 , 0.0 ,
     * 0.53, 1.15, 0.98, 0.83, 0.83, 0.67, 0.59, 0.59, 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.04, 0.06, 0.06, 0.06, 0.08, 0.08, 0.0 ,
     * 0.21, 0.14, 0.08, 0.19, 0.19, 0.19, 0.06, 0.06, 0.0 , 0.0 ,
     * 0.53, 1.15, 1.24, 1.56, 1.56, 1.56, 0.25, 0.25, 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.03, 0.02, 0.02, 0.01, 0.01, 0.02, 0.0 ,
     * 0.21, 0.14, 0.19, 0.06, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.53, 1.15, 1.56, 0.25, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.01, 0.01, 0.02, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.21, 0.14, 0.14, 0.20, 0.40, 0.40, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.53, 1.15, 1.15, 2.92, 5.00, 5.00, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.36, 0.62, 0.62, 0.10, 0.10, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.66, 1.12, 1.12, 0.48, 0.48, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0   /
C
      END
```

A.20 BDIM

```
      BLOCK DATA                                                        00000100
C                                                                       00000200
      COMMON/INCREC/PCIMHN,PCIMHY,PCIMCN,PCIMCY                         00000300
C                                                                       00000400
      INTEGER PCIMHN(19,5,4),PCIMHY(19,5,4),PCIMCN(19,5,4),             00000500
     *  PCIMCY(19,5,4)                                                  00000600
C                                                                       00000700
C                                                                       00000800
      DATA PCIMHN/ 3, 6,11,15,19,24,27,31,35,39,41,42,44,46,47,48,49,51,00000900
     * 52,    4, 8,13,18,22,28,34,36,40,42,45,46,49,50,51,52,54,56,57,  00001000
     *        7,14,20,28,34,39,43,46,49,52,54,55,57,58,59,60,61,62,63,  00001100
     *        8,15,22,30,36,41,46,49,52,54,56,58,59,61,62,63,64,65,65,  00001200
     *        8,16,23,31,37,42,46,50,53,55,57,59,60,61,62,63,64,65,66,  00001300
     *        4, 6, 9,11,16,19,20,23,25,28,29,30,32,33,35,36,36,37,38,  00001400
     *        6,11,16,20,23,27,31,33,36,38,40,41,43,44,45,46,47,48,49,  00001500
     *       10,18,24,29,33,35,40,42,45,47,48,50,51,53,55,55,55,57,58,  00001600
     *       12,20,26,32,37,40,43,46,49,51,52,54,55,56,57,59,59,60,61,  00001700
     *       13,22,28,34,39,43,46,49,51,54,55,57,58,59,61,61,62,63,64,  00001800
     *        4,11,22,32,42,49,54,58,62,64,66,68,69,71,72,73,74,74,75,  00001900
     *        4,13,25,37,46,53,58,62,65,67,69,71,72,73,74,75,76,77,77,  00002000
     *        4,15,29,40,49,55,60,64,67,69,71,72,74,75,76,77,77,78,79,  00002100
     *        5,17,31,43,51,58,63,66,69,71,73,74,75,76,77,78,79,79,80,  00002200
     *        5,18,32,44,53,59,63,67,70,72,73,75,76,77,77,79,79,80,81,  00002300
     *        3, 7,14,23,31,38,44,49,53,56,58,60,62,63,65,66,67,68,69,  00002400
     *        3, 7,15,24,33,40,46,51,54,57,60,62,63,65,66,67,68,69,70,  00002500
     *        3, 7,16,25,34,41,47,51,55,58,60,62,64,65,67,68,69,70,71,  00002600
     *        3, 8,17,26,35,42,48,52,56,59,61,63,65,66,68,69,70,71,71,  00002700
     *        3, 8,17,27,36,43,49,54,57,60,62,64,66,67,68,69,70,71,72/  00002800
C                                                                       00002900
      DATA PCIMHY/ 6,13,17,20,25,32,35,40,45,47,49,50,53,53,54,56,57,57,00003000
     * 58,    9,14,19,25,31,36,43,45,50,51,53,54,55,56,58,58,61,63,63,  00003100
     *       12,19,27,35,41,44,51,53,55,57,59,61,61,63,65,65,66,66,67,  00003200
     *       13,24,33,40,46,50,54,57,59,61,63,65,65,66,68,68,69,70,71,  00003300
     *       14,25,35,42,48,53,56,59,62,64,65,66,68,69,70,70,71,72,72,  00003400
     *        9,13,15,18,22,26,28,31,33,35,37,39,40,42,44,44,44,46,48,  00003500
     *       13,16,20,26,31,34,38,41,43,44,45,47,48,50,52,52,53,54,55,  00003600
     *       14,21,28,33,39,41,45,47,50,52,53,54,56,57,59,60,61,61,62,  00003700
     *       15,24,31,36,41,44,48,50,52,54,55,55,56,60,61,62,63,63,65,  00003800
     *       16,26,33,39,43,47,50,53,55,57,59,60,61,63,64,65,65,66,67,  00003900
     *       10,33,51,59,67,70,74,78,79,80,80,81,82,83,84,84,85,85,86,  00004000
     *       13,36,53,62,69,73,76,78,80,81,82,83,83,84,85,85,86,86,87,  00004100
     *       15,38,54,64,70,74,77,79,81,82,83,84,85,85,86,86,87,87,87,  00004200
     *       16,39,54,64,70,74,77,80,81,83,84,85,85,86,87,87,87,88,88,  00004300
     *       16,39,54,64,70,74,77,80,81,83,84,85,86,86,87,87,88,88,88,  00004400
     *        7,24,36,52,54,65,65,69,72,75,75,75,77,79,79,80,80,81,81,  00004500
     *       11,29,45,56,63,68,70,74,76,76,78,80,80,81,82,82,83,84,84,  00004600
     *       12,32,46,58,65,69,72,75,76,77,80,81,81,82,83,83,84,85,85,  00004700
     *       14,36,52,62,68,73,75,78,80,81,82,83,84,85,85,86,86,87,87,  00004800
     *       15,38,54,64,70,74,77,79,81,83,84,85,86,86,87,87,88,88,88/  00004900
C                                                                       00005000
```

```
C                                                                        00005100
      DATA PCIMCN/ 7,13,17,22,26,30,32,35,37,40,41,42,44,45,46,47,48,50,00005200
     * 50,   9,17,22,27,31,35,37,40,42,44,46,48,49,51,52,53,54,55,56,    00005300
     *      12,21,27,32,36,40,44,47,49,52,53,55,56,58,59,60,61,62,62,    00005400
     *      14,23,29,35,39,43,47,50,52,55,56,58,59,60,61,62,63,64,65,    00005500
     *      15,25,31,36,41,45,49,52,54,56,58,59,61,62,63,64,65,65,66,    00005600
     *      10,15,20,23,26,28,31,32,34,35,37,37,38,40,41,41,42,43,44,    00005700
     *      17,25,29,32,36,38,41,42,44,46,47,48,49,50,51,52,52,53,54,    00005800
     *      21,31,36,40,44,47,49,51,53,55,56,57,58,59,60,61,62,62,63,    00005900
     *      23,34,39,43,46,49,52,54,56,57,59,60,61,62,63,63,64,65,65,    00006000
     *      25,36,41,45,49,52,54,56,58,60,61,62,63,64,65,66,67,67,68,    00006100
     *       0, 4, 8,14,20,26,30,33,35,39,42,44,45,48,49,50,50,53,55,    00006200
     *       0, 5,10,18,23,28,32,37,40,43,45,47,49,51,52,53,54,56,57,    00006300
     *       1, 6,13,21,27,33,38,42,45,48,50,52,54,56,57,59,60,61,62,    00006400
     *       1, 6,14,22,28,34,39,43,47,49,52,54,55,57,58,60,61,62,63,    00006500
     *       2, 7,14,22,29,35,40,44,47,50,52,54,56,58,59,60,61,62,63,    00006600
     *       0, 2, 7,13,19,24,29,33,37,40,43,45,47,49,50,52,53,54,55,    00006700
     *       0, 4,11,19,26,32,37,42,45,48,51,53,55,56,58,59,60,62,62,    00006800
     *       1, 5,13,21,28,34,40,44,48,51,53,55,57,58,60,61,62,63,64,    00006900
     *       2, 8,18,28,36,42,47,52,55,58,60,62,63,65,66,67,68,69,70,    00007000
     *       3,12,23,33,42,48,53,57,60,63,65,66,68,69,70,71,72,73,74/    00007100
C                                                                        00007200
      DATA PCIMCY/11,20,26,30,34,40,43,47,50,52,53,55,58,57,58,59,61,60,00007300
     * 62,  16,23,29,35,40,43,49,51,54,55,57,58,59,60,62,62,64,66,66,    00007400
     *      20,29,37,42,47,49,55,57,59,61,62,64,64,66,67,68,68,68,70,    00007500
     *      22,34,41,46,51,55,58,61,63,64,65,67,68,69,70,70,71,72,73,    00007600
     *      23,35,42,48,53,57,60,62,65,66,68,69,70,71,72,72,73,74,74,    00007700
     *      17,25,27,31,35,38,40,43,44,45,49,50,50,53,54,54,55,56,58,    00007800
     *      26,33,36,41,46,48,51,54,56,57,58,59,60,61,63,63,64,65,66,    00007900
     *      30,41,47,50,54,57,59,61,63,65,65,66,67,68,69,70,71,71,71,    00008000
     *      32,45,50,54,57,60,63,64,65,67,68,69,70,71,72,72,73,73,74,    00008100
     *      33,47,52,56,60,62,65,67,68,69,70,71,72,73,74,74,75,75,76,    00008200
     *       5,24,40,48,56,60,65,67,69,72,72,74,75,76,77,78,78,79,79,    00008300
     *       8,27,42,51,58,63,66,69,71,73,74,76,76,77,78,79,79,80,80,    00008400
     *      11,29,43,52,59,64,67,70,72,74,75,76,77,78,79,80,80,81,81,    00008500
     *      13,30,43,52,59,64,68,71,73,75,76,77,78,79,80,80,81,82,82,    00008600
     *      14,30,43,52,59,64,68,71,73,75,76,77,78,79,80,81,81,82,82,    00003700
     *       9,30,41,56,58,68,68,71,74,77,77,78,79,81,81,81,81,82,83,    00008800
     *      15,37,51,60,66,70,72,76,77,78,80,82,82,82,83,84,84,85,85,    00008900
     *      18,39,52,62,68,71,74,77,78,79,82,82,82,84,84,84,85,86,86,    00009000
     *      21,43,57,66,71,75,78,80,81,83,84,85,85,86,86,87,87,88,88,    0000910
     *      23,44,58,66,72,76,79,81,83,84,85,86,86,87,88,88,88,89,89/    0000920
C                                                                        0000930
      END                                                                0000940
```

APPENDIX B: MOBILE1 ERRATA

(The ERRATA list below is identical to that included in a notice dated May 4, 1978, 'MOBILE1 ERRATA and ADDITIONAL INFORMATION FOR THE USER', which was sent to all recipients of MOBILE1. Copies of MOBILE1 which were sent after this date included the appropriate corrections.)

During the course of the distribution of the MOBILE1 source program, a few program errors were discovered, or were brought to our attention by users. These errors were corrected as they became known, and subsequently distributed copies of the source program reflected the corrections.

As a result, the majority of programs were distributed with the corrections included. However, some of the distributed programs include one or more of the errors described below. Therefore, <u>please check your source program for the following errata:</u>

(Because of slight variations in source program line numbering, the errors and corrections will be described contextually and not by line number.)

1. In SUBROUTINE IDVINX, the variable CYP should be explicitly declared as type INTEGER. If the seventh record of IDVINX reads:

```
INTEGER CY,CYIMP,CYIP1,DELY,DEL2,DEL
```

change it to:

```
INTEGER CY,CYP,CYIMP,CYIP1,DELY,DEL2,DEL
```

2. In SUBROUTINE CCEVAX, the DATA statement should read:

```
      DATA CCEV/12*6.63,5*3.33,3*2.53,7*1.76,2*0.60,16*0.15,
     *          12*6.63,5*3.33,3*2.53,7*1.76,2*0.60,16*0.15,
     *          17*7.70,11*2.53,1*0.60,16*0.15,
     *          17*7.70,13*2.00,15*0.30,
     *          45*0.,
     *          27*1.60,18*0.,
     *
     *          10*6.63,3*3.33,7*2.53,7*1.76,2*0.60,16*0.15,
     *          10*6.63,3*3.33,7*2.53,7*1.76,2*0.60,16*0.15,
     *          17*7.70,10*2.53,2*0.60,16*0.15,
     *          17*7.70,7*2.00,2*1.19,3*0.87,16*0.30,
     *          45*0.,
     *          27*1.60,18*0.,
     *
     *          12*9.00,5*4.52,3*3.44,6*2.39,1*1.76,2*0.81,4*.2,12*.15,
     *          12*9.00,5*4.52,3*3.44,6*2.39,1*1.76,2*0.81,4*.2,12*.15,
     *          17*10.46,9*2.72,2.00,2.72,0.81,4*0.20,12*0.15,
     *          17*10.46,16*2.72,12*0.30,
     *          45*0.,
     *          27*2.17,18*0.        /
```

3. In SUBROUTINE INITEX, add the ng two lines of code immediately following the first line of the subroutine:

```
      COMMON/FIGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMBFG,IMFLG,ICEVFG,PRTFLG,IFORM
```

4. In SUBROUTINE INPUT, change FORMAT statement 729 to read:

```
729   FORMAT(I2,1X,I2,1X,I1,1X,I2,1X,I2)
```

5. In SUBROUTINE OUTPUT, change the following line (which is approximately line 33100 of MOBILE1:

```
      REAL SPD(3)
```

to the following:

```
      REAL SPD(3),XLOAD(3)
```

6. In SUBROUTINE BIGCPX, the following lines of code should appear, starting approximately at line 72400 of MOBILE1:

```
      DO 500 IMODE = 1,4
C
      IMOD4 = IMODE
      IF(IMODE.EQ.4) IMOD4 = 6
      IAGEM = IAGE
        MAX = MAXAGE(IMODE)
      IF(IAGEM.GT.MAX) IAGEM = MAX
        IF(IAGEM.EQ.0) VMTAGE = 0.0
        IF(IAGEM.GT.0) VMTAGE = CURMIL(IAGEM,IMOD4)*.0001
C
        IGE = G(MYC,IREJN,IMODE)
C
      DO 500 IP = 1,3
```

The corrections consisted of, first, the addition of the following line:

```
      IF(IAGEM.EQ.0) VMTAGE = 0.0
```

and, second, the correction of the line that follows it. That line previously read:

```
        IF(IAGEM.GT.0) VMTAGE = CURMIL(IAGEM+1,IMOD4)*.0001
```

7. In SUBROUTINE LDVIMX, the following lines of code should appear, starting approximately at line 114900 of MOBILE1:

```
      IPROGM = 1 + IMTFLG
C     ISTRIN = .1*ISTRN
      IF(ISTRN.LT.10.OR.ISTRN.GT.50) STOP
      IREM = ISTRN - (ISTRN/10)*10
      REM=IREM*.1
      ISTRIN = ISTRN*.1
      CYIMP = ICYIM
      CYIP1 = ICYIM + 1
```

In addition, the following lines of code should appear, starting approximately at line 118000 of MOBILE1:

```
C
       IF(DEL.EQ.0) PCRED = 0.0
       IF(DEL.GT.0) PCRED = PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL)*.01
     *  + REM*(PCIM(DEL,ISTRIN+1,ITECH,IPROGM,IPOL) -
     *           PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL) )*.01
C
```

PLEASE REFER TO ITEM NO. 3 IN APPENDIX C DESCRIBING ANOTHER MODIFICATION TO SUBROUTINE LDVIMX.

APPENDIX C: RECENT MOBILE1 ERRATA AND MODIFICATIONS

1. In SUBROUTINE BEFGEN, the following lines of code should occur immediately below the statement 100 CONTINUE:

```
         DO 450 I = 1,20
         DO 450 J = 1,26
         DO 450 IM = 1,6
         IF(NMHFLG.EQ.1) BEF(I,J,1,IM) = BEF(I,J,1,IM)*NCNMTH(I+J-1,IM)
   450   CONTINUE
```

2. If the user desires column headings at the top of IFORM=0 output, the following lines of code should be inserted in SUBROUTINE OUTPUT, if they are not already there.

   Insert the following three lines of code:

```
         IF(IFORM.EQ.0) WRITE(IWRI,7012)
         IF(IFORM.EQ.0) WRITE(IWRI,7013)
         IF(IFORM.EQ.0) WRITE(IWRI,7014)
```

   immediately after the following line:

```
         IF(IFORM.EQ.0) WRITE(IWRI,7011) PROJID
```

   Then insert the following format statements after any statement in SUBROUTINE OUTPUT:

```
7012  FORMAT('CR                                                      P'/,
     *        ' E                             AMB.                    O',
     *  '            COMPOSITE EMISSION FACTORS                           ',
     *  'VEHICLE MIX                      C.E.F.')
C
7013  FORMAT(1X,'G CY   BAG SPEEDS   TMP   COLD/HOT START  L   L',
     *  'DV     LDT1   LDT2   HDG     HDD     MC ',
     *  '    LDV   LDT1  LDT2  HDG     HDD    MC ',
     *  ' ALL VEH')
C
7014  FORMAT(' - -- -------------- ---  ----------------',
     *  ' . ------------------------------------------',
     *  ' ------------------------------------',
     *  ' ----- ')
```

3. In SUBROUTINE LDVIMX, there is a line of code which reads:

```
         ISTRIN = ISTRN*.1
```

   Change the line of code listed immediately above to a comment (by inserting the character 'C' in column 1), and immediately after this line insert the following two lines:

```
STRN = (ISTRN + 0.5)*0.1
ISTRIN = STRN
```

Note that changing the line to a comment will yield TWO lines performing the same operation that are now comments.

The intended purpose of this code is to convert the I/M program stringency, which is supplied by the user, into an array index. Thus, if the stringency (ISTRN) has a value between 10 and 19, the index (ISTRIN) should be 1. Similarly, if ISTRN is between 20 and 29, ISTRIN should be 2, and so on.

We have found, however, that certain IBM FORTRAN compilers generate code that causes ISTRIN to take a value of 0, instead of 1, for ISTRN=10, to take a value of 1, instead of 2, for ISTRN=20, and so on. The reason for this is as follows: The binary representation of the value 0.1 in these compilers is such that when it is multiplied by, say, 10, the result is not 1.0, but .99999.... Then when this value is assigned to the integer variable ISTRIN, it is, correctly, truncated to zero. Similarly, when ISTRN=20, the product yields 1.9999..., and upon assignment to ISTRIN, this is converted to 1.

We have found that the IBM FORTRAN compilers which exhibit this characteristic are the G and H compilers. The G1 and H Extended compilers, on the other hand, yield the expected results.

The modification listed above should be made to all programs. It will eliminate this bug if it exists, and will not affect program operation where this bug does not appear.

4. The following modification will allow the user to enter a VMT mix ONE TIME which will apply to all emission factor calculations in a given run. Insert the following three lines of code in SUBROUTINE INPUT:

```
IF(VMFLAG.EQ.2.AND.IPROMT.EQ.1) WRITE(IWRI,769)
IF(VMFLAG.EQ.2.AND.INFLAG.EQ.0) READ(IREAD,*) VMTMIX
IF(VMFLAG.EQ.2.AND.INFLAG.EQ.1) READ(IREAD,726) VMTMIX
```

These lines of code should be inserted after the following statement:

```
766    FORMAT(' ENTER IFORM:')
```

5. In SUBROUTINE INPUT, replace FORMAT statement 772 with the following:

```
772   FORMAT('0ENTER YEAR I/M BEGINS, STRINGENCY, M.T. FLAG,',
     *  /,' FIRST MODEL YEAR AND LAST MODEL YEAR OF PROG. BENEFITS')
```

6. If the user wishes to include light-duty trucks and motorcycles in calculations of benefits due to Inspection/Maintenance programs, the version of SUBROUTINE LDVIMX that is presently in the source program should be replaced by the version listed below. This new version already includes the modifications described in Appendix B, Items 1 and 7, and Appendix C, Item 3.

```
      SUBROUTINE LDVIMX
C
      COMMON/BEFCOM/BEF(20,26,3,6)
      COMMON/IMCOM/ICYIM,ISTRN,IMTFLG,MODYR1,MODYR2
      COMMON/IMCRED/PCIM
C
      INTEGER CY,CYP,CYIMP,CYIP1,DELY,DEL2,DEL
      INTEGER PCIM(19,5,4,2,2)
C**IN PCIM: DEL,ISTRIN,ITECH,IPROGM,IPOL
C
C***********************************************************************
C
      IPROGM = 1 + IMTFLG
C     ISTRIN = .1*ISTRN
      IF(ISTRN.LT.10.OR.ISTRN.GT.50) STOP
      IREM = ISTRN - (ISTRN/10)*10
      REM=IREM*.1
      STRN = (ISTRN + 0.5)*0.1
      ISTRIN = STRN
      CYIMP = ICYIM
      CYIP1 = ICYIM + 1
C
      DO 100 IPOL=1,2
      DO 100 CY = CYIP1,95
C
          CYP = CY-69
          DELY = CY - CYIMP
C
      DO 90 I = 1,20
         MY = CY - (20-I)
         MYP = MY - 50
         DEL2 = MY - CYIMP
C
      IF(MY.LT.MODYR1.OR.MY.GT.MODYR2) GO TO 90
C
      IF(MY.LE.CYIMP) DEL = DELY
      IF(MY.GT.CYIMP) DEL = DELY - DEL2
      IF(DEL.GT.19) DEL = 19
C
C*TEST FOR TECH. I, II, III, OR IV
      DO 80 IMCD=1,4
      IMODE=IMOD
      IF(IMOD.EQ.4) IMODE=6
      IF(IMOD.EQ.2) GO TO 72
      IF(IMOD.EQ.3) GO TO 72
      IF(IMOD.EQ.4) GO TO 74
      IF(MY.LT.75) ITECH = 1
      IF(MY.GE.75.AND.MY.LE.79) ITECH = 2
      IF(MY.EQ.80) ITECH = 3
      IF(MY.GE.81) ITECH = 4
      GO TO 77
72    CONTINUE
      IF(MY.LT.83) ITECH=1
      IF(MY.GT.82) ITECH=2
      GO TO 77
74    CONTINUE
      ITECH=1
77    CONTINUE
C
      IF(DEL.EQ.0) PCRED = 0.0
      IF(DEL.GT.0.AND.ISTRIN.LT.5)
     * PCRED = PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL)*.01
     *   + REM*(PCIM(DEL,ISTRIN+1,ITECH,IPROGM,IPOL) -
     *           PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL) )*.01
C
      IF(DEL.GT.0.AND.ISTRIN.EQ.5)
     * PCRED = PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL)*.01
C
      PCLEFT = 1. - PCRED
C
      BEF(I,CYR,IPOL,IMODE) = BEF(I,CYR,IPOL,IMODE)*PCLEFT
80    CONTINUE
C
90    CONTINUE
100   CONTINUE
C
      RETURN
C
C     DEBUG SUBCHK
C
      END
```

7. The following modifications to the MOBILE1 source program are required to enable the emission factor modification option, which is invoked if ALTFLG=1. The changes are listed by subroutine.

<u>A. MAIN</u>

i) Replace the following COMMON statement, which occurs near the top of the routine:

```
      COMMON/ALTCOM/NEWALT,ALTMOD
```

with the following:

```
      COMMON/ALTCOM/INTALT(5,100),B4ALT(2,100),MODFLG(100),NEWFAC
```

ii) Replace the following record, which is approximately Record No. 64 of MAIN:

```
IF(IREJN.NE.IRJOLD) CALL INITEX(NMYALT,ALTKOD)
```

with the following:

```
IF(IREJN.NE.IRJOLD) CALL INITEX
```

B. SUBROUTINE INPUT

i) Replace the following COMMON statement, which occurs near the top of the routine:

```
COMMON/ALTCOM/NMYALT,ALTKOD
```

with the following:

```
COMMON/ALTCOM/INTALT(5,100),B4ALT(2,100),MODFIG(100),NEWFAC
```

ii) Insert the following lines:

```
C**HERE READ IN E.F. MODIFICATION DATA
      IF(ALTFLG.NE.1) GO TO 810
      IF(IPROMT.EQ.1) WRITE(IWRI,790)
790   FORMAT('ENTER NO. OF NEW E.F. INTERCEPT/SLOPE PAIRS (I2)')
      IF(INFLAG.EQ.0) READ(IREAD,*) NEWFAC
      IF(INFLAG.EQ.1) READ(IREAD,791) NEWFAC
791   FORMAT(I2)
C
      DO 800 IFAC = 1,NEWFAC
C
      IF(IPROMT.EQ.1) WRITE(IWRI,792)
792   FORMAT(' ENTER REGION,VEH. TYPE,POLLUTANT,FIRST MY,',
     * /' LAST MY,NEW INTERCEPT (A), AND NEW SLOPE (B)')
      IF(INFLAG.EQ.0) READ(IREAD,*) IRGALT,IMDALT,IPLALT,
     *  MYFRST,MYLAST,BASNEW,DELNEW
      IF(INFLAG.EQ.1) READ(IREAD,793) IRGALT,IMDALT,IPLALT,
     *  MYFRST,MYLAST,BASNEW,DELNEW
793   FORMAT(I1,1X,I1,1X,I1,1X,I2,1X,I2,1X,F6.2,1X,F6.2)
C
        INTALT(1,IFAC) = IRGALT
        INTALT(2,IFAC) = IMDALT
        INTALT(3,IFAC) = IPLALT
        INTALT(4,IFAC) = MYFRST
        INTALT(5,IFAC) = MYLAST
        B4ALT(1,IFAC) = BASNEW
        B4ALT(2,IFAC) = DELNEW
C
800   CONTINUE
C
810   CONTINUE
```

These lines should be inserted immediately after the following line, which is approximately Record No. 87:

```
710    FORMAT(10F5.3)
```

C. SUBROUTINE [illegible]

i) Replace the following COMMON statement, which occurs near the top of the routine:

```
      COMMON/ALTCOM/INTALT,ALTMOD
```

with the following:

```
      COMMON/ALTCOM/INTALT(5,100),B4ALT(2,100),MODFLG(100),NEWFAC
```

ii) Insert the following lines :

```
C**WRITE E.F. MODIFICATION PROFILE
      IF(ALTFLG.EQ.0) GO TO 100
      IF(IFCRM.EQ.0) GO TO 100
C
      WRITE(IWRI,765)
      WRITE(IWRI,766)
      DO 111 IFAC = 1,NEWFAC
      IF(MODFLG(IFAC).EQ.0) WRITE(IWRI,767) (INTALT(J,IFAC),J=1,5),
     *  (B4ALT(K,IFAC),K=1,2)
      IF(MODFLG(IFAC).EQ.1) WRITE(IWRI,768) (INTALT(J,IFAC),J=1,5),
     *  (B4ALT(K,IFAC),K=1,2)
111   CONTINUE
100   CONTINUE
765   FORMAT('0','   EMISSION FACTOR MODIFICATION PROFILE:')
766   FORMAT(' REGION  MODE  POLLUTANT  FIRST MY  LAST MY    BASE      ',
     * 'DEL  ALTERED',                                                  ',
     *     /,' ______ ____ ________  _______  _______    ____          ',
     * ' ___  _______')
767   FORMAT(1X,2X,I1,7X,I1,8X,I1,7X,'19',I2,5X,'19',I2,4X,F6.2,2X,F6.2,
     * 4X,'NO')
768   FORMAT(1X,2X,I1,7X,I1,8X,I1,7X,'19',I2,5X,'19',I2,4X,F6.2,2X,F6.2,
     * 4X,'YES')
C**END E.F. MODIFICATION PROFILE
```

These lines should be inserted immediately after the following line, which is approximately Record No. 66:

```
      IF(IFCRM.EQ.1) WRITE(IWRI,701) PROJID
```

D. SUBROUTINE [illegible]

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i) Replace the following COMMON statement, which occurs near the top of the routine:

```
      COMMON/ALTCOM/NMYALT,ALTKOD
```

with the following:

```
      COMMON/ALTCOM/INTALT(5,100),B4ALT(2,100),MODFLG(100),NEWPAC
```

ii) Eliminate the following 18 records, starting approximately at Record No. 17000:

```
      IF(ALTFLG.EQ.0) GO TO 777
C
      DO 450 ICH = 1,NMYALT
      IF(ALTKOD(1,ICH).EQ.MY) GO TO 877
450   CONTINUE
      GO TO 550
877   CONTINUE
C**HERE FOR ALTERATION
      IALT = ALTKOD(IP+1,ICH)
C
      IF(IALT.EQ.0) GO TO 777
      IF(IALT.EQ.1) IEQN = 3
      IF(IALT.GT.1) IEQN = 4
777   CONTINUE
C
C*****************************************
C
550   CONTINUE
```

E. SUBROUTINE INITEX

Replace the version of SUBROUTINE INITEX that is presently in your source program with the version listed in Appendix A, Section 6.

F. SUBROUTINE EFALTX

Replace the version of SUBROUTINE EFALTX that is presently in your source program with the version listed in Appendix A, Section 11.

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